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ABSTRACT

These workbooks provide students with opportunities to research and explore future options based on the realities of today. The workbooks each consist of four research units, a future force section, and a reference section. Students are actively involved in the learning process and in acquiring information. The research units in Book I focus on: (1) "Population, Life Expectancy, and Housing"; (2) "Energy"; (3) "Space Exploration and Social Welfare"; and (4) "Transportation and Global Mobility." The research units in Book II focus on: (1) "Communication, Silicon Chips, and Robots"; (2) "Work, Leisure, and Education"; (3) "Health/Medical Technologies and Your Life"; and (4) "Values and Expediencies." Contains a total of 75 references. (EH)

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FUTURE OPTIONS UNLIMITED

A Textbook for Alternative Futures

Book I

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Dr. Eldon Meyer and
Donald David Zielin[illegible]

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FUTURE OPTIONS UNLIMITED

A Textbook for Alternative Futures

Book I

Written by Dr. Eldon Meyer and Donald David Zielinski
Illustrated by Karen Neulinger

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We appreciate and give thanks to the following newspapers and periodicals from which many of the lessons and assignments in this book were developed:

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The authors met in World Future Society activities. Both firmly believe that Future Studies deserve a greater emphasis in the schools.

A NOTE FROM THE AUTHORS

The future of this world and its inhabitants should be, for obvious reasons, everyone's primary concern, and most people want to understand the forecasts made for the days and years ahead. There certainly is curiosity and excitement relating to Future Studies, but there are also other considerations.

Future Studies has a weighty responsibility because it attempts to view a world characterized by rapid and continual change. Decisions must be made today that will insure the survival of humanity on this planet and, at the same time, hopefully enhance conditions and provide medical care for all.

Morality is involved, as well as ethics and values. We hope schools will take a leading role in the decision-making processes affecting a better future.

We salute the futurists in classrooms throughout the world.

Eldon M. Meyer
Donald D. Zielinski

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Preface

Future Options Unlimited is a series of student-oriented workbooks which deal with future studies and which focus on three areas: 1) our present-day world is undergoing a series of rapid and convulsive changes; 2) those of us who understand these changes and adapt to them can prepare for the future and avoid future shock; and 3) future options are available, and we can intelligently select from them.

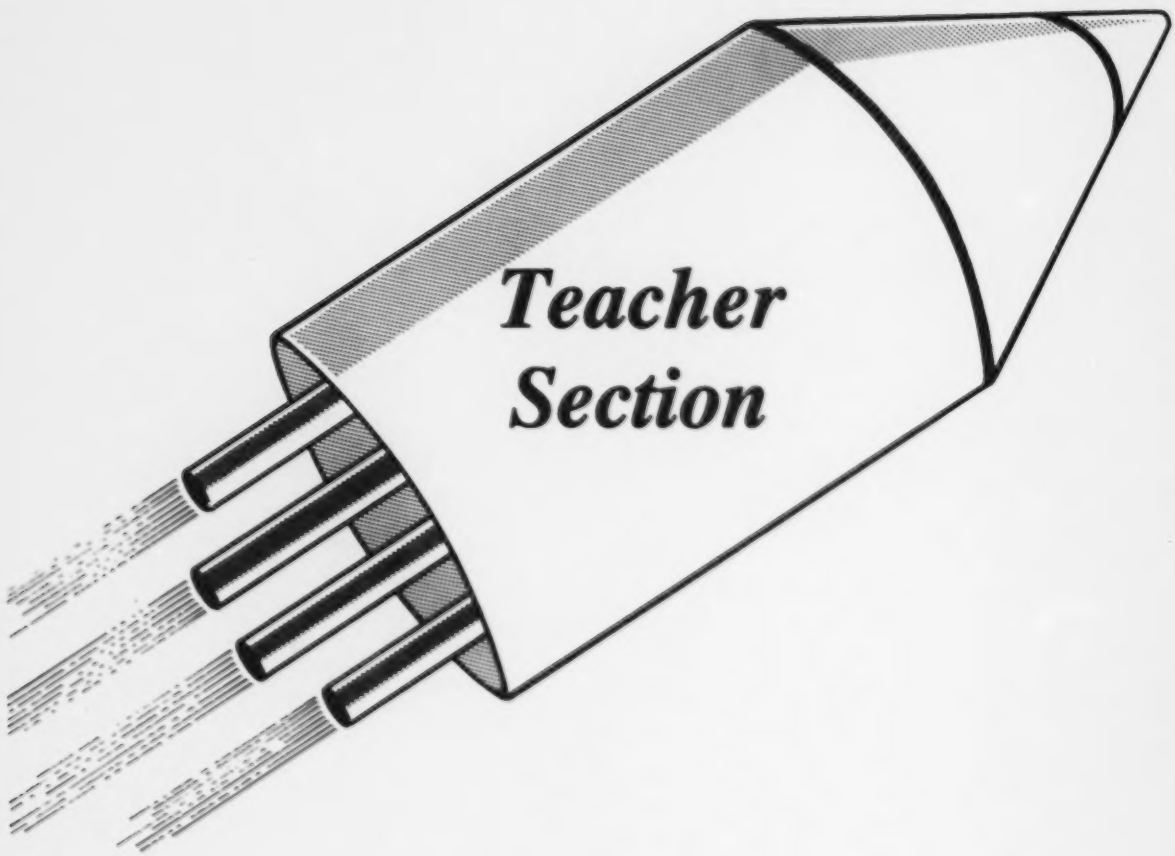
Future Options Unlimited has been designed for grades seven through twelve (five through twelve, gifted), although it could be used as a resource for other grade levels. Talented students will be able to use these materials with a minimum of teacher assistance.

The uses of newspaper and periodical items in ***Future Options Unlimited*** are examples of materials and topics readily available to the student-futurist from local news sources. The procedures described in the lessons and assignments can be replicated using other newspapers and other future-oriented news articles. Teachers and students are encouraged to supplement the items with current, updated news stories and materials from their own local newspapers and periodicals.

Assignments are intended to have reference to a rapidly-changing world and to relate to students' personal growth and understanding. There are no answer sheets. Evaluation is based upon student participation and involvement. The teacher role can be expanded from instructor to include advisor, counselor, and companion on the path to the future.

Above all, the program is geared to students' future needs as adults.

The Authors


Teacher
Section

To the Teacher

This section has been designed with one major purpose in mind: to make ***Future Options Unlimited*** an easy-to-understand, easy-to-use teaching aid that will strengthen your future-studies program.

"There seems to be a great deal of work for the students" was a recurring comment from those who were asked to preview the workbook. In answer to this, we would like to point out that ***Future Options Unlimited*** is a *flexible* unit. Teachers may choose as little or as much of the material as they wish. What's more, the unit may be presented at any time of the year. Our hope is that the material will be used on a consistent basis throughout the year. But it is your choice!

The heart of the workbook consists of four RESEARCH units, a FUTURE FORCE section, and a REFERENCE section. Each research unit involves the students in most of the following: debates, forecasts, research, reports, oral presentations, personal assessments, journals, notebooks, brainstorming, evaluation grids, and surveys. Future Force is a general introduction to the study of the future. The Reference Section has many important components, such as Mini-Biographies and What Futurists Have Said, which includes suggested activities. A Glossary defines many words that are used in the units.

Naturally, we look upon all aspects of the workbook as important. But there will be some who will use the journals and not the dictionaries or the notebooks. Some may bypass the debates. Others will be selective when they examine the research and report activities. Once again, the keyword is *flexibility* and may we suggest *creativity* and *imagination* as well.

There is, however, one aspect of the workbook that is extremely important, and we strongly recommend that you do not omit it: the CPS (Creative Problem Solving) Grid. The brainstorming and the eventual selection of alternative solutions are integral parts of the workbook's structure.

As a last word, be FLEXIBLE. Use your IMAGINATION. And we are certain that you will be CREATIVE.

Now, let's move forward, for an exciting future awaits us all.

THE FUTURE

You and your students can expect to live in a different future—continually changing, predictable and unpredictable, exciting, frustrating, indeterminate, and/or chaotic. The extent to which you can understand and anticipate changes will to some degree determine the quality of life you will have in your tomorrow.

Future Options Unlimited is designed to aid you in presenting important concepts to students regarding future changes and how those changes might affect them. The workbook should not be considered a source for answers to predetermined questions, but rather a resource for students who are concerned about their tomorrows.

An important segment of *Future Options Unlimited* relates to pessimism versus optimism. Which are you—an optimist or a pessimist? When you think about the future, do you see it as better than today? Years from now, will the quality of life around you be richer, enhanced by fingertip sources of energy, improved by larger, less expensive housing and/or by access to bountiful supplies of food? Or will your future standard of living be compromised by extremely high-priced energy, out-of-reach housing costs, a need to share nearly everything, and an exploding national and world population?

You, a teacher-futurist, will be living in a part of the same future as your students. You are in a position to lead your students into an exciting adventure: an examination of the future and their role in that future. Your own research, your positive attitude, and your open responses will undoubtedly influence your students. Your perception of your role as a teacher-futurist is both important and critical.

Here are some of the significant questions that you and your students will address: Can futurists make valid forecasts? Is there only one future of which we are all a part? Or are there many futures? What kinds of utopias might people plan for? Or should they plan for disasters? Are there too many people on earth? What solutions might be developed in response to any population problems? With adequate planning, can the earth support six billion people? Eight billion? Fifteen billion? How many people do you think the earth can support?

An unlimited number of questions can be asked. A thematic concept, however, that appears in all of the questions and activities is this: Which alternative futures do you want and which don't you want? Helping students recognize alternatives in their future and helping them choose preferable futures might be your most important task as a teacher-futurist.

DICTIONARIES, JOURNALS AND FILES

One anticipated outcome of this introductory study of the future is that in the course of their research students will develop some ideas and concepts that will help them in their lives, both in and out of school. To achieve this outcome, students are assigned as a continuing project the organization and maintenance of three basic notebooks. It is very important that students keep these up to date. All three of these (the dictionary, the journal, and the file) could be placed in the same loose-leaf notebook, but we have found that three separate notebooks are more useful. This allows the teacher, for example, to check the students' dictionaries without having to contend with the bulk of the other two sections.

We recommend that the dictionaries and files be checked and graded on a regular basis. The students can also share their journals with you, but some of them might be reluctant to do this because of the nature of their entries; their privacy should be respected. Students should also be asked to share their new words, the clippings in their file, and appropriate journal entries with the class.

A FUTURIST'S DICTIONARY

This is a vocabulary notebook, set up in alphabetical order. New words can be added and placed in the correct order.

Assignments will introduce or suggest new words. These words should be immediately defined and added to the dictionary. Eventually, students might want to expand these definitions. For example, FUTURIST might be one of the first words in their list. A beginning definition might be "someone who studies the future." As students gain insight into future-related concepts, they might add to their definitions the idea that futurists "do not predict the future but rather study trends and alternatives for the future." By the end of the program some students might revise the definition even further by stating that a futurist "is one who systematically studies about the future to establish possibilities regarding living and working in the future. A futurist is sometimes referred to as a futurologist or a long-range forecaster."

The futurist vocabulary words will help your students understand and formulate new concepts. The word lists are valuable tools for them as they progress through study units, engage in research, develop reports, and involve themselves in other future-related activities.

A FUTURIST'S JOURNAL

This is a combination journal and notebook—something like a ship's log—where students can record their thoughts concerning the future as they engage in research and proceed through ***Future Options Unlimited***. The futurist's journal should contain most or all of the following: ideas and thoughts, observations, quotes, interesting statements and phrases, summaries of books, reactions to statements made by other class members and/or the teacher, future designs, recipes of the future, forecasts, and questions. The journal is important because it can reflect the student's growth in future-related thinking.

Some segments of the journal might be a basis for a class report. If your schedule permits, on occasion allow class time for the sharing of journal entries.

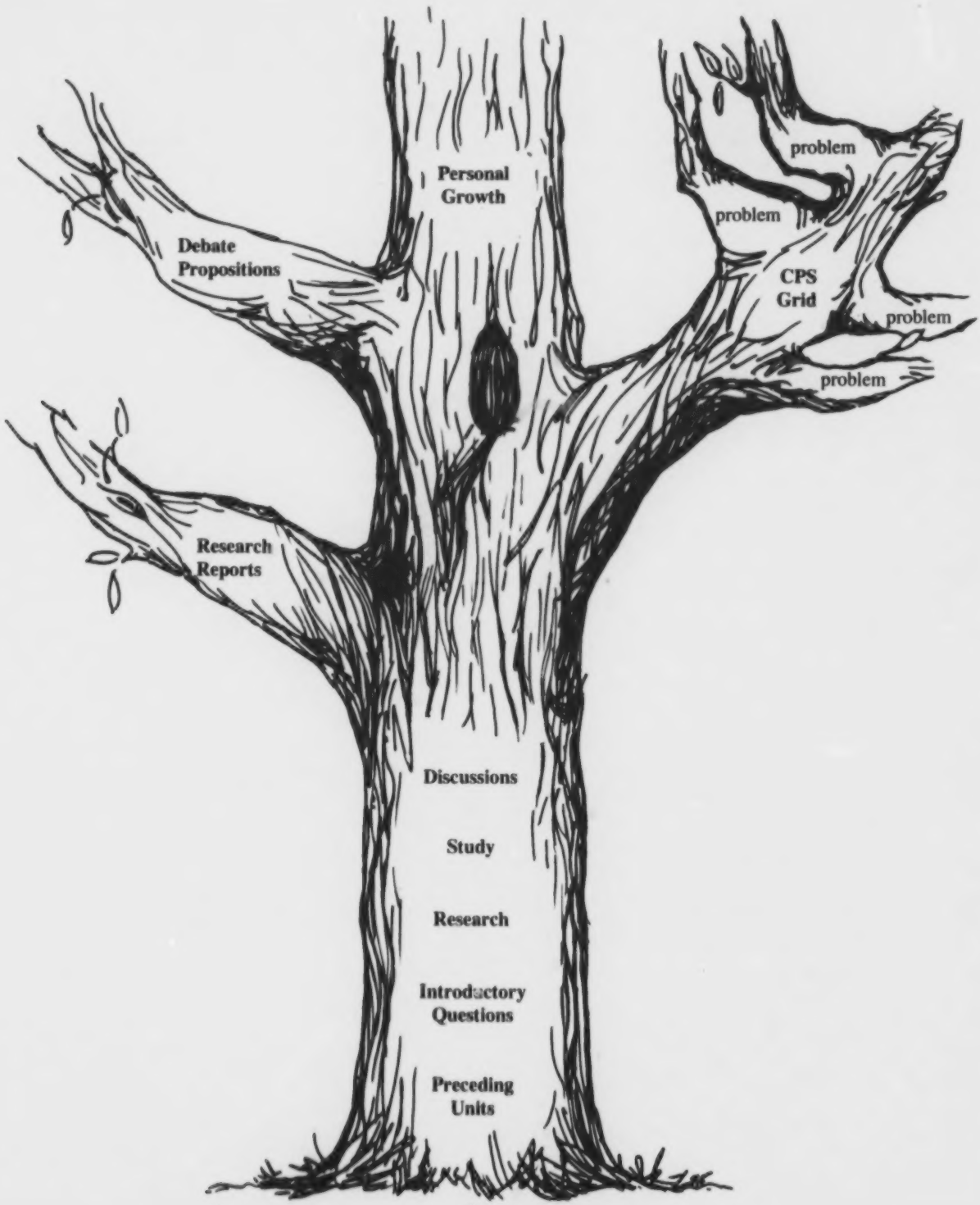
A FUTURIST'S FILE: Clippings and Articles

In this file students will place items relating to the future which they have found in newspapers and magazines. They should be instructed to note the date of each news item as well as the source.

Encourage the students to include other items in this file such as reviews, comments, and analyses of books and films dealing with future studies, science, or science fiction. Again, they should note the date and source of each item.

RELATIONSHIP TREE

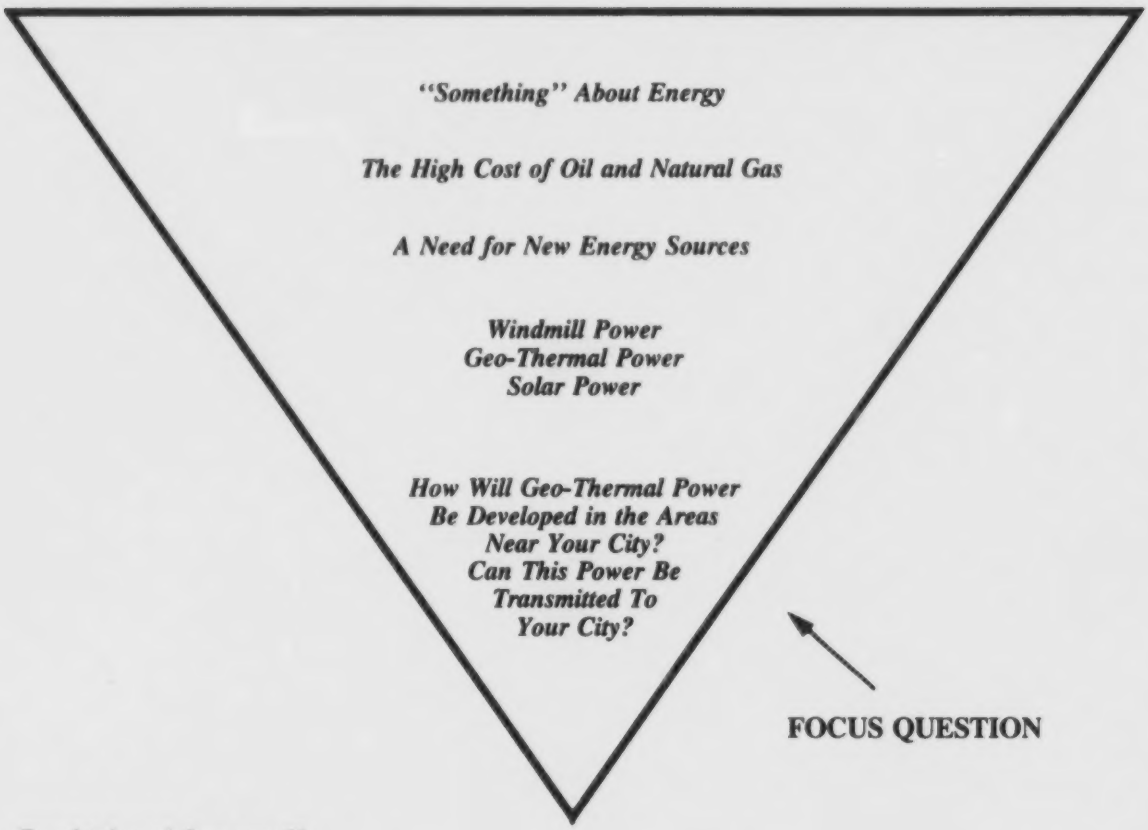
The questions and news items provided with each study unit serve as a basis for research, discussion, and oral and written reports. After the questions and the news articles have been explored, students move on to more sophisticated activities geared to individual and personal development, such as the use of the CPS grid.



GROUP AND INDIVIDUAL RESEARCH

There are many students who feel that research means opening a reference book in the library and copying a few interesting paragraphs or pages. One of your more important tasks, therefore, is to help your students develop a concept of investigative procedure. Two important facets of this task are the FOCUS QUESTION and the use of the THINKING or PROCESS VERBS (discussed later in this section).

It is important to establish the Focus Question before any type of research is initiated. Unless the students know exactly where they are going, a great deal of time can be wasted. The triangle below illustrates the progression from a rather vague idea through various refinements until a very specific target, the Focus Question, is reached.


"Something" About Energy
The High Cost of Oil and Natural Gas
A Need for New Energy Sources
Windmill Power
Geo-Thermal Power
Solar Power
How Will Geo-Thermal Power Be Developed in the Areas Near Your City? Can This Power Be Transmitted To Your City?
FOCUS QUESTION

Completed graph from page 32:

ALPHA, PAST GROWTH AND FUTURE PROJECTION

	Year	*Percentage Of Growth*	*Change In No. Of People*	*New Population Figures*
PAST	1920	New City	---	2,000
	1930	10%	200	2,200
	1940	14%	308	2,508
	1950	84%	2,107	4,615
	1960	minus 12%	minus 554	4,061
	1970	minus 7%	minus 284	3,777
	1980	6%	227	4,004
CURRENT	1990	8%	320	4,324
FUTURE	2000	7%	303	4,627
	2010	5%	231	4,858
	2020	4%	194	5,052

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RESEARCH AND REPORT TOPICS AND SUGGESTIONS

Futurism by its very nature is action oriented. There would be no need for future studies if all people were bystanders waiting for something to happen. This text assumes that students who will be living in the future will be concerned enough about that future to engage in many of these action-oriented activities.

Phase III-C of each unit, Individual or Small Group Action Research, uses action-oriented questions. Students present their work to the class based on your schedule.

ORAL REPORTS

The oral-report segment is very important because it combines so many basic techniques: outlining, public speaking, listening, and discussion. Students share their research with the class, and many important discussions arise from these presentations.

All students should be responsible for at least one oral presentation. Since time is a factor, you might want to have one fourth of the class make an oral presentation for each study unit. It might be helpful to show the class how to "highlight" their written reports—that is, how to communicate the important sections of their research without reading every word. This can be done in conjunction with a discussion of outlining.

The class should also be trained in listening skills. As the student reads and presents his or her report, class members should take notes, preparing to ask questions at the conclusion.

As you grade the oral reports, look for the following: 1) Was there a logical organization to the report? 2) Assuming the report was well structured, did the speaker transmit the information to the audience? 3) Did the speaker maintain eye contact with the audience? 4) Did the speaker display poise and use acceptable vocabulary? 5) And lastly, was the speaker able to support the thesis of the report during a question-and-answer period?

SURVEYS

The students can start their survey experiences with simple questions which are asked in a friendly environment and then move into more complicated situations.

To start, the students can survey members of their home. The students should not feel threatened in this type of situation, and the survey instrument can be basic, using yes-or-no or simple multiple-choice questions. The students may also wish to submit questions to neighbors in the immediate vicinity of their homes. At this stage, they might begin by asking a yes-or-no question; for example, they may ask, "Are you concerned with the world's increasing population rate?" This might be followed by a simple multiple-choice question whose options would list various acceptable limits to the world's population: 10 billion, 20 billion, and so on.

Students might then progress to a middle stage by visiting several classrooms in the school and asking several hundred students their opinions on a particular subject. The questions at this point should be more complicated. The interviewees might be asked to rate their preferences for alternative futures by using a 0-10 scale. Fill-in-the-blank questions could also be used.

In the final stage, the students might go to shopping centers or other public places. In addition to the types of questions mentioned above, open-ended ones might be added. These, of course, are more difficult to tabulate. The following is an example of an open-ended question: In twenty-five years the two most profound changes in our society will be _____

_____.

The results of all surveys should be presented to the class, and discussion should follow each presentation.

DEBATES

Among the project activities suggested in Phase III of each study unit are debates. Placing three students on each team has proven to be a successful format, although two students per team will do on occasion. Each group of three must determine which aspect of the topic to cover. The strongest debater of the three should be placed last because this is the member of the team who not only makes important contributions of his or her own, but also summarizes the presentations of the other two.

Since debate topics are worded to argue for a change in a present condition, the AFFIRMATIVE position is considered the more difficult, and this team is allowed to speak first. The order of presentations in this modified debate program is as follows:

1. 1st speaker for AFFIRMATIVE: makes the introductory remarks and possibly provides a history of thought concerning the topic
2. 1st speaker for NEGATIVE: same role as above
3. 2nd speaker for AFFIRMATIVE: expands the position of the first speaker by providing supporting statements and facts
4. 2nd speaker for NEGATIVE: same role as above
5. 3rd speaker for AFFIRMATIVE: combines the arguments and positions of the first two speakers and presents a powerful plea to the judges (the class) that the AFFIRMATIVE position is the correct one
6. 3rd speaker for NEGATIVE: same role as above

The next phase is the REBUTTAL PHASE. The speakers are given time to criticize the statements of the opposing team. This segment should be held to a two-minute maximum for each speaker. The order of the presentations are now reversed: NEGATIVE speakers are followed by AFFIRMATIVE speakers.

The last phase is the QUESTION-AND-ANSWER segment. A moderator, who has been seated between the two teams and who has provided direction up to this point, can control the questions from the class so that both positions receive approximately the same number of questions.

SCORING

Each member of each team is given a score for his or her efforts in three different areas: the introductory presentations, the rebuttal critiques, and the question-and-answer period. This means that there will be nine scores for each debate team. An easy scoring system is 0-10, with 10 being the highest:

10: A plus
9: A
8: B
7: C
6: D
5: D-
4 and below are variations of F

At the conclusion of the debate, you may select seven students to place their cumulative scores on the blackboard. These seven cumulative scores are added, a grand total is obtained, and the victorious team is announced.

A more complicated procedure (but certainly acceptable) is to give the scores of **all** the judges (class members) to a student who will add them overnight. This student will announce the winner on the day following the debate.

BRAINSTORMING

Brainstorming is a valuable technique in the classroom because it allows the group to work together to solve problems. It also provides for "piggybacking," allowing one student to "hop on" another student's idea and create still another idea.

The teacher or a student will write all the ideas on the board. However the teacher must first explain that any thought or idea is acceptable. No student is to criticize nor laugh at any of the ideas. This objective climate is extremely important so that all ideas are expressed. The class should be encouraged to use imagination, to offer as many ideas as they wish, to piggyback on the ideas of others and, above all, to be creative!

THE EVALUATION GRID

The Evaluation Grid in the Reference Section was taken from *Away with Problems!*, written by Marilyn Brown et al. Ms. Brown, in turn, acknowledges the work of Dr. Sidney J. Parnes and Dr. E. Paul Torrance, two leaders in the field of educational creativity.

To use the grid you must first select a problem that needs to be resolved. Let us say it is in the field of energy. Perhaps one of your students suggests the following: How are we going to face the problem of decreasing reserves of fossil fuels?

The next step is to write on the board all the alternative solutions suggested by the class. Help the students use the brainstorming technique to produce the ideas. Star the ten solutions that the class considers the most appropriate. The students will write these on their grids.

The next task is to select criteria. Place one criterion in each of the categories marked "A" through "E." For example, the words WORTH THE COST might be placed under Criterion A; AVAILABILITY might be written in the space for Criterion B; and so on. Brainstorm with the class to select the five criteria.

Now each student rates the solutions against the criteria on his or her grid. For example, a student may give Proposed Alternative Solution #1 a rating of 8 against the first criterion and 9 against the second criterion. That same student may decide to rate Proposed Alternative Solution #2 only 6 and 5 against the same criteria. The students should be instructed to rate all the solutions against the same criterion before moving to the next. In other words, they are to move down before they move across. Each rating number should be used only once per criterion.

After they have placed all the scores on the grid, the students total each solution's points horizontally and place the figures in the TOTALS column. They then rank the solutions, putting the highest scores at the top.

In order to reach a class consensus, the students are placed in groups of two, then four, then eight, and possibly sixteen. In each of the groups the students must use a NEGOTIATION procedure, a give-and-take discussion, to reach an agreement regarding the rankings. Student A, for example, may "trade" a ranking in one area if Student B will do likewise in another area. The final two or three lists should be placed on the board for class discussion and consensus.

The two or three Proposed Alternative Solutions which receive the highest scores in the TOTALS column can be assigned as Phase IV (Creative Problem Solving) projects. One third of the class, for example, would investigate the Proposed Alternative Solution which had the highest point total; one third of the class would deal with the Proposed Alternative Solution which had the second highest point total; and one third of the class would work with the Proposed Alternative Solution which had the third highest point total.

Each group would use library research, interviews, surveys and other methods to demonstrate that its Proposed Alternative Solution was the best. A written or oral report would complete the project.

REFERENCE SECTION

The Reference Section is an important part of this workbook. There is a WHAT SOME FUTURISTS HAVE SAID section with many useful project ideas; a GLOSSARY, which can be expanded into a year-round project; a READING LIST with excellent sources; student reference forms entitled GETTING READY FOR THE FUTURE; and an EVALUATION GRID. The student forms and the grid will be used four times, once for each study unit. These pages should be duplicated for the students.

THINKING SKILL (PROCESS) VERBS

An important aspect of teaching is to lead your students to higher plateaus, to higher levels of thinking. Two educational theorists, Benjamin S. Bloom and J. P. Guilford, developed classifications and strategies which identify these higher levels. The verbs in this list can assist you as you urge your students to move from a simple knowledge of the material to more sophisticated concepts such as analysis and synthesis.

At the beginning, you might want to concentrate on the areas of knowledge, cognition, and application (LISTS I-III). As you progress, you will want to move on to the areas of analysis and convergent production (LIST IV) and then to synthesis and divergent production (LIST V). Eventually, you will want the students to operate at the level of evaluation (LIST VI).

The following are examples of how the verbs from LIST VI would be used to encourage students to use the higher-level thinking-skill evaluation:

1. **Appraise** the efforts of the nations of the world to control nuclear warfare.
2. **Criticize** the arguments of those who state that coal should be the only replacement for oil.

FOUR-PHASE UNITS

This is a suggested outline you might wish to follow. However, you may want to include some of your own materials and extend the unit or you may wish to omit some of the activities to accelerate the unit. The amount of time spent on each lesson will vary.

INTRODUCTION

The class reads the list of questions which appears at the beginning of each unit. Discussions and/or observations may occur at this point, and you may not wish to stop these. You may even want to add student-developed questions. By the end of lesson, however, the students should have selected their questions from the INDIVIDUAL RESEARCH and GROUP RESEARCH areas. Try not to assign more than two students to a GROUP RESEARCH question if possible. All students answer the INFORMATION QUESTIONS.

WORDS TO KNOW

Students find definitions for the words on their WORDS TO KNOW sheets. The definitions can be found in dictionaries or in the GLOSSARY in the Reference Section.

A limited discussion may take place at this time. In the first unit, for example, the word "megalopolis" can be discussed; you could possibly describe the belts of population that stretch from point A to point B, such as Boston to Baltimore or Los Angeles to San Diego. If some students finish early, they can work on their assigned research questions.

PHASE I

Students read the articles and answer the questions in the section entitled REACTION TO THE ARTICLES. Call on some students to read their work to the class; a class discussion can ensue at this point.

PRACTICE GRAPH

Use the practice graph located in the Reference Section and allow the students to develop extrapolations/projections about the topic. After they have completed the graph, a class discussion might precede their efforts to complete the page entitled FORECAST. This provides the opportunity to use today's realities and statistics to forecast future developments in eras twenty-five and fifty years hence (or whatever time segments you choose).

PHASE II

At this point the students inject their forecasts into a society of the future. They are to deal with the impact of their forecasts upon the cultural/socio-economic fabric of a world that will exist (as an example) twenty-five years from now. If, for example, they have forecast a world in which there are no gas-driven vehicles, then what impact would this have on OPEC? On a typical car owner? On our nation's economy? On several governments that have heretofore depended on oil revenues? On international relationships?

PHASE III-A

The first few days can be devoted to library research and/or the final revisions of the research topics. They can also be used by the students who will participate in the debates to continue their research and conferences.

Students present their reports to the class. Due to time limitations, all of the reports may not be heard. You may wish to select those to be read, you may ask for volunteers, or you may choose to have the class decide which reports they want to hear. (Ten to twelve reports over a period of three days is the suggested number.)

Communication is an important aspect of our industrialized and technological world. The students who are making presentations should make sure that their material has been well organized, carefully outlined, and logically sequenced. The audience, on the other hand, should refine their listening skills, taking notes as they hear the reports.

PHASE III-B

The debate teams support/reject the proposition that was selected. The procedure was previously discussed in the DEBATES section.

PHASE III-C

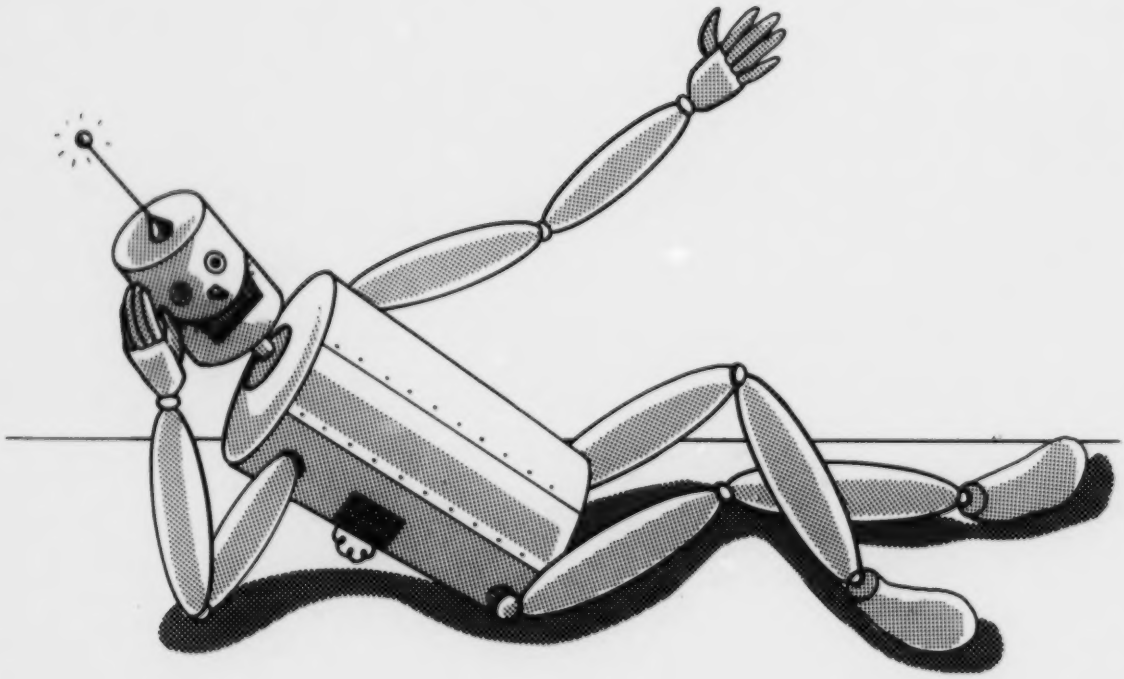
Students present the results of their work in the action-oriented research field. These may be surveys, interviews, murals, slide presentations, etc. A list of suggested activities is presented in the workbook. You may wish to replicate some of these findings and distribute them to the students.

PHASE IV

Either you or your students select one or more problems. Brainstorm for solutions and criteria and complete the EVALUATION GRID. Instructions have been previously given.

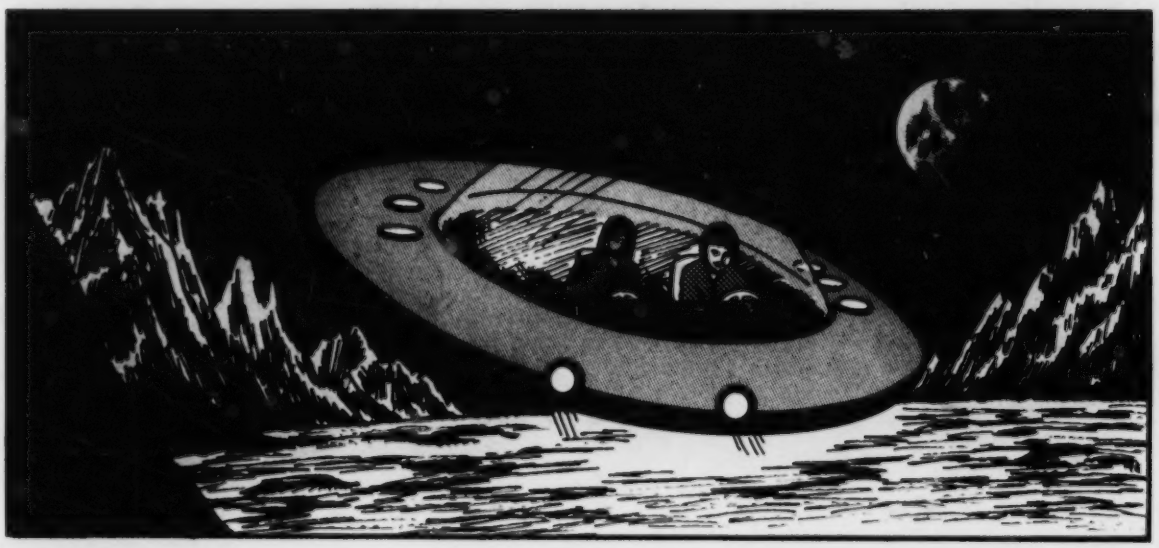
FUTURE OPTIONS UNLIMITED STUDENT SECTION

Welcome to YOUR future



ENTER THE FUTURE...

AND BRING A FRIEND



You and Your Future

Future Options Unlimited is based on a premise that you and your friends are interested in potential changes that will affect your future. Your future cannot be taught using traditional academic patterns! A future-studies curriculum with predetermined answers does not exist. Instead, you will be looking for trends, alternatives, ideas, projections, and future concerns that should be planned, anticipated, and explored because you will live in that continually changing, technological tomorrow.

Therefore, you and your friends must become an ongoing, viable part of your curriculum. For that reason alone, you will want to study all you can about your future. Questions in this book are thinking questions, asking you for your opinions, information, ideas, and data.

How old will you be in thirty years? In fifty-six years? In seventy-two years? How many people over the age of ninety will you know, compared to how many you know today?

Will you be working an eight-hour day and a five-day week with the same company where you started? Will you be working on your fifth job? Or your ninth? Will you have a new employer, or will you be working for yourself? How often, as jobs phase out, will you be a student, either part or full time, to learn a new profession? Maybe you will be seeing the world as a retiree.

Will you live in a larger or smaller house than the one you live in now? How will that house be different? What new types of foods will you eat? What will you do with your free time?

In your journal, WRITE your responses and ideas about these questions and comments. You will be using them later in class discussions. Your ideas are important.

Objectives of Future Study

If you have been thinking about questions such as those mentioned on the previous page, you are already working on your objectives for this class. The following objectives are not all-inclusive, but rather open-ended so that you and your teachers might study them, change them, and add objectives of your own, perhaps more suited to your own perceptions. WRITE "yes" in front of each objective after you have read it and ask yourself "Why?" and "How?" As you study the materials in your workbook, YOU WILL...

_____ 1. Become more aware of ideas regarding a changing future that includes an important ingredient—you.

_____ 2. Study future-related ideas together with your teachers. The quality and degree of your participation should provide the most valid criteria for evaluation of your work.

_____ 3. Learn futurist research techniques through actual practice in your assignments.

_____ 4. Examine global relationships that will affect concepts related to sharing world resources with other peoples.

_____ 5. Study and evaluate ways in which technologies will influence directions and rates of change in the next century.

_____ 6. Explore values regarding decision making based on research and long-term needs rather than on expedient interests dealing only with current situations.

After one week, ADD two more objectives. You may add or delete future-related objectives as you progress through your studies.

_____ 7. _____

_____

_____ 8. _____

_____

In the process of meeting your objectives, you will learn and use futurist terminology and philosophy and become acquainted with writings of prominent futurists and educators. You will learn that the study of the future has become a serious science of forecasting, but not of prediction. Like other futurists, you will study trends and alternatives for living in your future. You will see the future as a part of a continuum that includes the rich heritage of the past, a momentary present time, and a changing, challenging future.

YOU will be facing that future! Are you preparing for it today? How will you get ready for your changing tomorrow?

Does Your Future Belong to You?

Yes _____ **No** _____ **Maybe**_____

Why or why not?

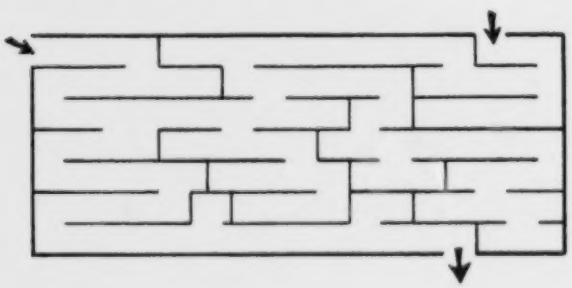
_____

_____

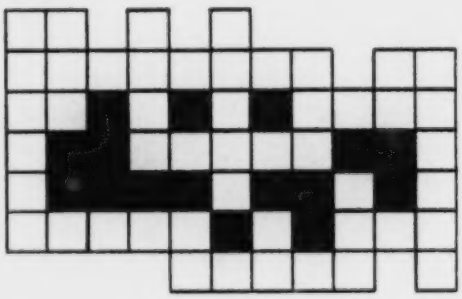
_____

_____

Does your future look like this?



Or this?



What do you need to do in order to plan for your future?

_____

_____

_____

_____

_____

Where do you want to go in your future work and life? What would you like to achieve? What is the best way for you to learn more about your future? WRITE your ideas here.

_____

_____

_____

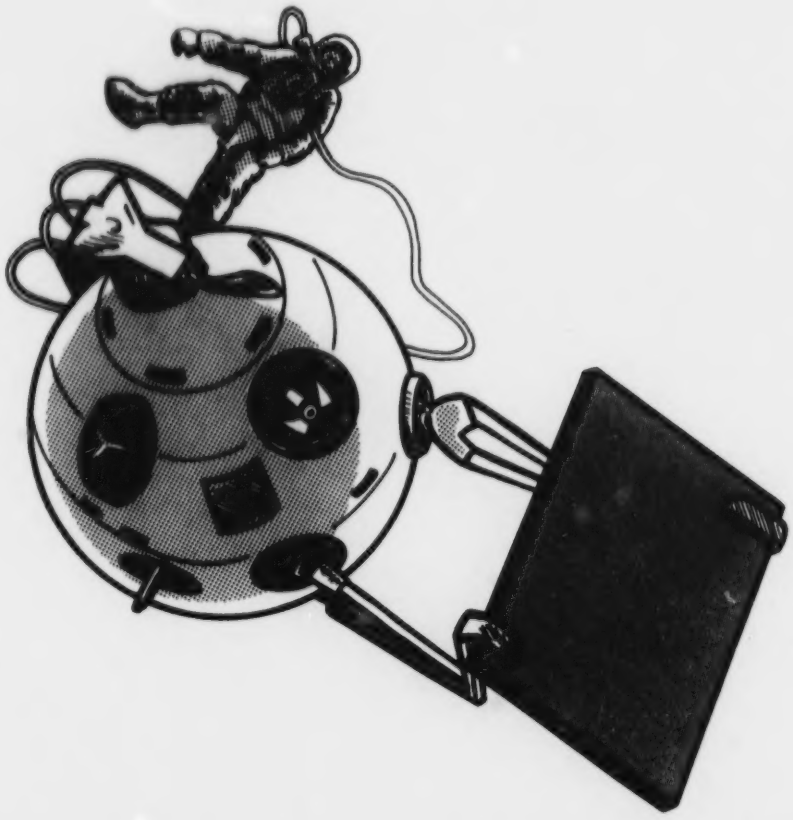
_____

_____

_____

Or Is Your Future Already Here?

New developments in science and technology have many important implications regarding your future. You have learned from your parents and teachers that you live in a different world from the one they knew as students. You have already experienced many changes—new energy sources, new medical and health techniques, microcomputers, satellite global communication, space travel, gas-efficient cars, and improved mass transportation systems. LIST here five more advances taking place in your world.



Anticipated changes promise to be even more far-reaching and spectacular. They will affect your lifestyle, your environment, and the way you communicate with others. ***Future Options Unlimited*** will provide information, concepts, ideas, and trends that can help you think about the future before it arrives. To study ahead about future plans and alternatives is preferable to reacting to events after they have already occurred.

A Future Worth Having

Whose future is involved in your study of this workbook?_____

In your future, will most people live longer? _____

Will there be more people in your world? _____

How long are you going to live? _____

Will your future living spaces be larger or smaller? _____

Will you work a 40-hour week, a 20-hour week, or not at all? _____

How many times will you change jobs in your lifetime? _____

Will you alternate work with schooling for most of your life? _____

Will all people in the world have enough food and shelter? _____

Will energy be adequate to meet the needs of all people? _____

Will clean air and drinkable water be serious problems? _____

Will you have your own private car? _____

WRITE two more questions for you and other students to think about.

_____

_____

_____

_____

_____

_____

Everyone has a future. Some scientists believe that people born in the last twenty years of the twentieth century will have the potential of living through the twenty-first century and on into the twenty-second. What will people over a hundred years old do? Should that kind of future belong to you? Why or why not?

Your future will be characterized by continual change and adjustment. In projections, as well as in literature, the future is depicted on the one hand in optimistic terms of happiness and plenty; on the other hand it is depicted in pessimistic terms of competition among people for limited amounts of food, energy, and material goods. The truth will probably be somewhere in between.

On another paper, WRITE what you believe you can do to make your future the way you want it to be. Indicate how you think ***Future Options Unlimited*** might help you explore your future alternatives. Title your paper "A Future Worth Having."

Let Your Workbook Work for You!

Learn your book. Look at the TABLE OF CONTENTS. Find the four study units and write them below. (Note: The YOU ARE THE FUTURE FORCE unit is an introductory unit rather than a study unit.)

1. _____

2. _____

3. _____

4. _____

Each STUDY UNIT begins with Introductory Questions and ends with Study Activities. From the table of contents, LIST the four sections of each unit.

_____ _____

_____ _____

Note that each section of the study units provides information and a partial basis for the next section. All of the phases help you develop your research and information base for use in your personal understanding of future studies.

The intent of YOU AND YOUR FUTURE and the other introductory sections is to help you move into the spirit of future studies. Explanations of procedures and activities will help you as you move into the study units. Think of FUTURE FORCE as you. Your research and serious study will provide you with many ideas related to your own future.

The REFERENCE SECTION is the last major part of your workbook. It provides you with materials and ideas that can help you with your assignments and study. LIST five charts or graphs included in that section that have information which is new to you.

_____

_____

_____

Another reference tool is the GLOSSARY with definitions of many words used in your book.

How many of those words do you know? _____

HOW will you use your glossary to support your research and reports to the class?

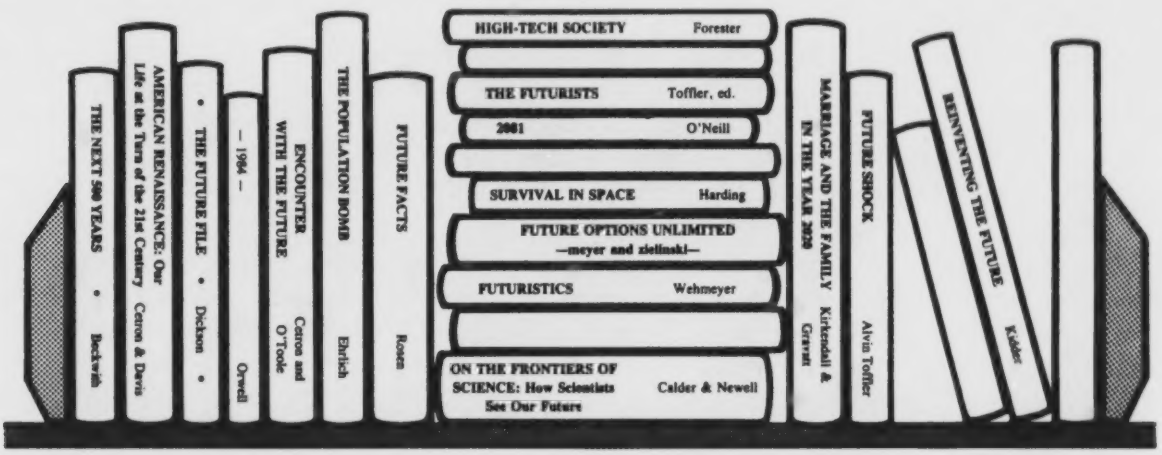
_____

_____

_____

Hundreds of new words enter the language every year, many from technological and future-oriented concepts. Plan to add many new words to your vocabulary.

Discover some interesting books. Start by looking in the RECOMMENDED FURTHER READING section of this workbook. Add new titles to that list. Also add those new titles to the spines of the simulated books illustrated here.


THE NEXT 500 YEARS • Beckwith
AMERICAN RENAISSANCE: Our Life at the Turn of the 21st Century Cetron & Davis
• THE FUTURE FILE • Dickson •
— 1984 — Orwell
ENCOUNTER WITH THE FUTURE Cetron and O'Toole
THE POPULATION BOMB Ehrlich
FUTURE FACTS Rosen
HIGH-TECH SOCIETY Forester
THE FUTURISTS Toffler, ed.
2081 O'Neill
SURVIVAL IN SPACE Harding
FUTURE OPTIONS UNLIMITED —meyer and zielinski—
FUTURISTICS Wehmeyer
ON THE FRONTIERS OF SCIENCE: How Scientists See Our Future Calder & Newell
MARRIAGE AND THE FAMILY IN THE YEAR 2020 Kirkendall & Gravatt
FUTURE SHOCK Alvin Toffler
REINVENTING THE FUTURE Kidder

WRITING ASSIGNMENTS in your book start with a key instruction word in capital letters. Your responses should include your ideas and concepts. Share your answers with your class or your teacher. Keep your papers in your journal or in your file for your future reference.

NEWS ITEMS are a special feature in your workbook. Articles have been excerpted (edited) from newspapers for more direct focus on future-related concepts. Your own collection of news articles, organized in general categories, will help you relate to your future studies and provide you with more up-to-date information for your research.

On the lines below, WRITE some of the ways in which you think the various sections and materials in your workbook can help you with your research, your reports, and your ideas about your tomorrows.

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News Items: Looking at the Future

Newspapers are available sources of information that relate directly or indirectly to your future. Other news sources, such as magazines, periodicals, and radio and television reports are also important and should not be ruled out in your primary research. At this point, however, newspapers should be your primary resource; newspapers have access to future-related information from all aspects of life and all areas of the world through national and international news services.

Look through your newspapers for articles and news headings. Cut or copy those items that correspond to your future-related topics or questions. (Check with family members before you cut out articles.) Put your articles in your News Articles File (page 25) for later reference.

The titles, or headings, listed below on the left represent news items or stories that have appeared in many newspapers recently. The headings provide clues regarding the materials covered in each item. What might be future-related topics for the news headings? MATCH the headings on the left with the topics on the right. Perhaps more than one topic would be appropriate for each.

Students Optimistic About the Future	fast food chains
Group Shows Profits to Be Made in Standing Rain Forests	American computers
International Joint Business Ventures Blur National Boundaries	ecology & environmental concerns
Sky-High Prices for ZR-1's Come Down to Earth	more people
World Population Rate Slowing	food products from around the world
	the future world
	personal transportation
	population control

The first news heading is the title of an article relating to college students' confidence as they graduate into the working world. Those graduates considered energy, inflation concerns and international relations as the most pressing problems facing them in their futures. With that heading and information, what kind of an article could you write? How might the ideas you present affect your future?

Time to be a reporter! WRITE one or more news items using the headings above. Write about optimism, values and judgments. Plan to read them to class.

You will be living in a period of great and significant changes throughout the world. The newspaper is a good information source regarding these changes. Even if your introductions to terms such as *apartheid, reunification* and *desalination* come from television and radio, newspapers can give you in-depth, up-dated information about the topics and places.

STUDY recent social changes in Nicaragua, Poland, South Africa, Albania, and other places where change is taking place. DESCRIBE why is it important for you to understand political events in Hong Kong, the Panama Canal Zone and Antarctica in the next few years? Include your source of information.

Your Future Notebooks

Future Options Unlimited is an introductory study about your future world. It does not predict future events. It does look at concerns and conditions which are caused by rapid changes taking place in the world today. It can help you learn new ideas and information that you might use in planning for your own future.

To help you achieve that kind of outcome, your basic assignments will include the following notebooks as continuing projects during the course of your study: 1) a journal of your future thoughts, 2) a dictionary of future-related terms and words, and 3) a collection of newspaper articles and information dealing with future ideas.

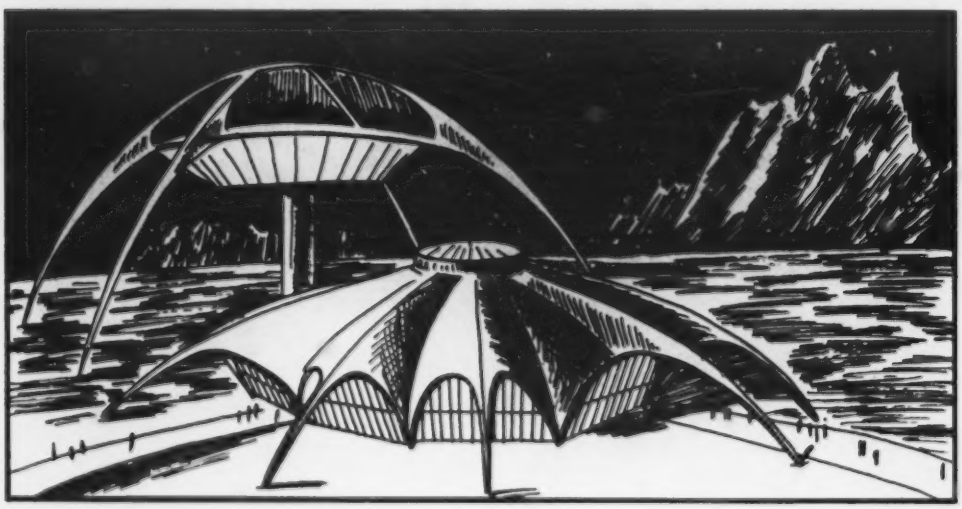
As your study progresses, you will find many advantages for using looseleaf notebooks for your journal, your dictionary, and your collection of news items. You will have more flexibility and facility in alphabetizing, organizing, and adding to or changing your materials.

Your journal, dictionary, and file will be checked periodically. You will be asked to share your new words, news items, and journal entries with your class. WHAT might be the best reason for students to share their ideas and discoveries with others? How will sharing benefit you?

_____

_____

_____



YOUR FUTURIST JOURNAL

Title your journal "My Future." Use a looseleaf notebook so that you will be able to index and date the information you collect. Keep your journal neat and orderly so you can quickly retrieve information. Your journal should contain, but not be limited to, results of your research and of your survey and notes from class and from your reading. One of the most important aspects of your future studies is that you develop your thoughts, ideas and concerns as you move through ***Future Options Unlimited.***

In WHAT WAYS will your journal be important to you when your projects are completed?

_____

_____

_____

These are suggestions for your journal entries: your ideas and forecasts for the twenty-first century; observations from your daily life reflecting your interest in the future; your reactions to statements made in class; interesting phrases and statements from materials you have read; recipes of the future (seaweed hamburgers?); futuristic designs for cities, cars, clothing, homes, and educational programs; and games about and for the future. You will pick up other ideas for your journal. Include the sources and dates of materials you use so that you will be able to find them again.

Use your journal when you prepare your reports. Submit questions based on your observations to your study group and to your teacher. Share your findings with the class.

DICTIONARY OF FUTURE-RELATED TERMS

Use a looseleaf notebook to set up a dictionary of future-related terms. Start with a separate page for each letter of the alphabet. New pages can easily be added in the correct location in your book as they are needed.

Add new future-oriented words and terms as you meet them in your reading and your assignments. Share them with your class. HOW might the glossary in the Reference Section of this book help you with your dictionary?

_____

_____

_____

WHERE will you look for new words?

_____

_____

NEWS ARTICLES FILE

Use this file to collect and organize newspaper and magazine articles regarding science, technology, and future trends. Add two to five items per week. Fasten them on separate papers with notes to help you recall what you considered important when you clipped and saved them. Index your file in at least ten general future-related headings such as those listed below. Start with these four categories:

1. Population
2. Energy
3. Space
4. Transportation

LIST other categories of interest to you.

5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

Suggestions for Additional Categories: Aging and Life Extension; Boundaries in the Future; Communication; Computerization; Cyborgs; Ecology and Conservation; Economics; Education; Food, Water, and Clean Air; Future Shock; Health and Medicine; Housing; Leisure; Life Values; Money; and Work. Use your own ideas and interests for topics also.

Look again at the Table of Contents. WHY do you think that the first four categories above were selected for you?

_____

_____

_____

_____

_____

_____

_____

Creative Problem Solving

Brainstorming and the use of an evaluation grid are two procedures used by groups in solving problems. They are especially effective when used together.

BRAINSTORMING

Add the action word "brainstorming" to your vocabulary. It is defined in *The New World Dictionary of the American Language* as "an unrestrained offering of ideas or suggestions by all members of a conference to seek solutions to problems."

In brainstorming, a problem is written on the chalkboard. Members of your group then react to the stated problem with their own short suggestions for solution. The suggestions are written on the board where all members of the group can see them and "piggyback" on each other's ideas to produce new ones. All ideas in brainstorming are accepted without judgment by the group. No comments are criticized as newer ideas are often based on those already given by others. When all ideas are presented, your group can discuss, combine, and prioritize them as part of the group activity.

Brainstorming is a good technique to use when a lot of ideas are needed in a short time. It is especially good to use in conjunction with an evaluation grid.

THE EVALUATION GRID

Look at the evaluation grid in the Reference Section of this book. Evaluation grids are used by groups to help with problem solving. You might want to draw your grid on a view graph or on an overhead projector to project on a screen. That way all members of your group will see the additions as they are made.

A problem is identified and placed on the grid. Group members suggest alternate solutions and the group determines which ten they consider to be the best. Those ten alternate solutions are written on the grid.

Criteria for evaluating the solutions will also be needed for the grid. Five criteria are identified and written in their designated spaces. Individual members of the group rate each of the solutions against each of the criteria. The entire group then rates, as a group decision, the suggested solutions against each of the criteria.

Your class can use brainstorming to arrive at both the alternative solutions and the criteria. When the class members have agreed, their choices for ten alternative solutions and five criteria should be entered on the evaluation grid.

STUDY and EVALUATE the suggested solutions under each of the five criteria. Copy the alternative solutions and the criteria on your own evaluation grid form. Rate the solutions against each of the criteria on a scale of one to ten with ten being the highest consideration. As much as possible, base your choices on data rather than on opinion alone. You might select under Criterion A a 6 for the first suggested solution and an 8 for the second. Rate all the alternate solutions under Criterion A before moving on to Criterion B. Criteria C, D, and E follow in turn.

When your own ratings are completed, compare them with those of another student. Work together until the two of you agree on the ratings. Add two more people to your group and work out agreements for the ratings that you can take to another group of four for comparisons and more agreement.

The best discussions and enthusiasm will take place after your class has grown into two or three large groups. Your class will then need to determine a consensus for the most preferred alternative solution.

When all spaces under the criteria are completed, total each line. WHAT is the next logical step?

DESCRIBE on the back of your own evaluation grid your thoughts about the problem-solving process and the decision reached by the group.

The Problem: _____

_____

_____

_____

EVALUATION GRID

Directions:

1. List your ten most appropriate solutions that fit the problem statement.
2. Brainstorm all the possible criteria that will help you evaluate your problem solutions.
3. Select one appropriate criterion from each of the "general criteria classifications" to put under A, B, C, D, and E.
4. Rate all alternative solutions against one criterion at a time. (The alternative that fits a criterion best rates a 10; the one that fits it least rates a 1.)

ALTERNATIVE SOLUTIONS	*Criterion A*	*Criterion B*	*Criterion C*	*Criterion D*	*Criterion E*	TOTALS
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Total each alternative solution's points horizontally and place below.

Adapted from the work of Dr. Sidney J. Parnes and Dr. E. Paul Torrance

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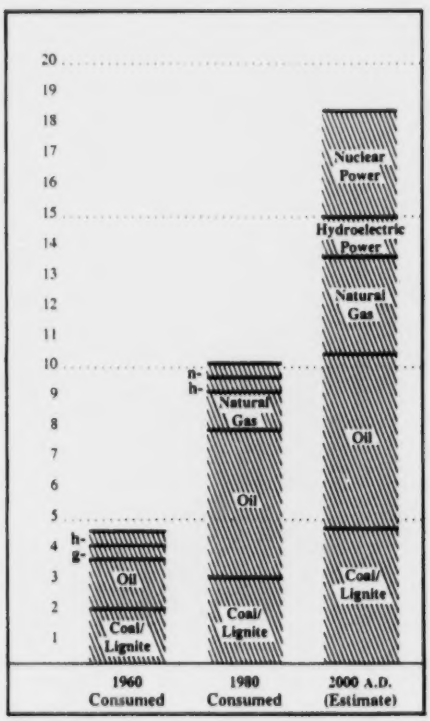
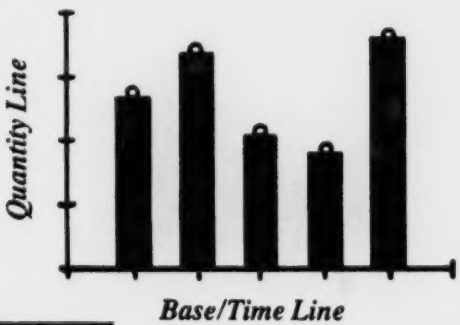
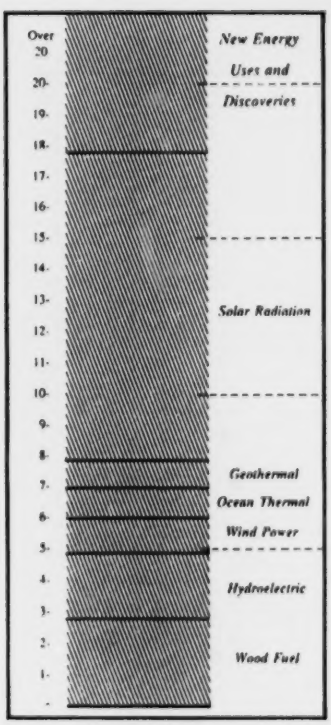
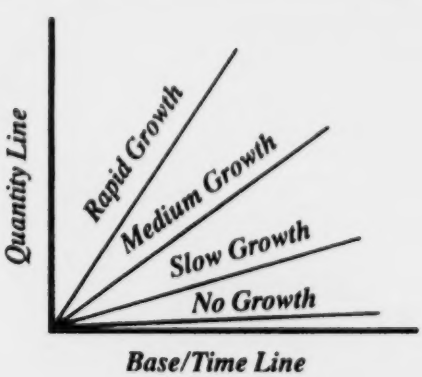
RESEARCH TECHNIQUES and PROCEDURES

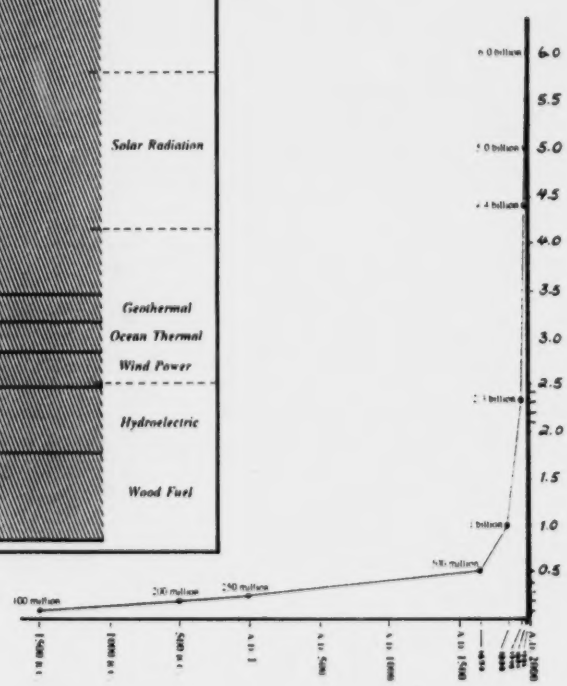
Teachers and Students as Futurist Researchers











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Projections and Forecasts

The projective techniques discussed in this book are but two of many used by futurists in researching into potential futures. One early method is now referred to as "genius forecasting" and is still used in business and family decisions. It is usually based upon past successes. When this method becomes more formalized and structured, it might be called "trend extrapolation."

GENIUS FORECASTING

In the past, most forecasting for the future was based on expedient needs and a continuation of decisions that had been successful before. Political and church leaders, parents, and others with authority made decisions for their families and communities. If actual events happened in a manner close to what had been forecast, the leaders were considered "expert." As serious study of trends and projections grew into a scientific attitude, the name "genius forecasting" was attached to successful uses of experience and authority for making decisions.

You have experienced genius forecasting in your own life. Consider the following questions:

Who decided where you would live and attend school?

_____

Who made decisions about school subjects and schedules that would be best for you?

_____

Have you ever been an "expert" for younger children? When?

_____

_____

LIST three important decisions that were made on your behalf when you were younger.

_____

_____

_____

Think about your school experiences today and what you would like in your future. On a separate paper WRITE some options that you might choose that could make a difference in your future. Refer to your own experiences in making choices. File your projections in your journal for comparison with your new ideas at a later time.

TREND EXTRAPOLATION

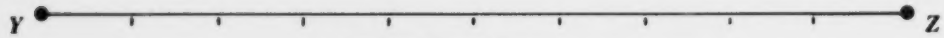
If your options were based on some past events that worked well for you, you might have used a form of "trend extrapolation." This technique involves the use of past events to help people make new decisions. It is used by serious planners in industry, education, government, and other enterprises.

The following is a practice exercise in trend extrapolation. Its purpose is to acquaint you with some terms and procedures in using graphs to describe trends.

Note the dots next to the letters "X," "Y," and "Z." To make your practice graph, first draw lines between dots "X" and "Y" and between "Y" and "Z." There will be no line between "X" and "Z."

The "base line" reaches from "Y" to "Z." It is the base of the graph and is also called the "time line."

Divide the time line of your practice graph into half-inch intervals as shown here. The marks represent equal time periods on your graph, such as minutes, weeks, years, or centuries.



Base or Time Line

The vertical line between "X" and "Y" is the "growth" or "quantity" line. Divide it, too, into intervals of one-half inch to indicate equal amounts of something that can be measured, relative to your projection.

The base/time and the growth/quantity lines with their marked intervals is a basic graph. It is used to show projections of estimates of past and future numbers.

In this exercise, write the ages six (6) through fourteen (14) to match the marks on your time line. The first mark to the right of the vertical line is six years, the second is seven years, and so on through nine marks to mark age fourteen. Write grade levels one (1) through six (6) to correspond with the marks on the quantity line. Indicate on your graph that the time line numbers refer to years of age and the quantity line represents grade levels in school.

Place a dot above the time line mark for age six and even with the grade one mark on the growth line. This shows that at age six a student was in grade one. Place a second dot above age seven and even with grade two. What does that indicate about a seven-year-old?

_____

Add more dots to show an eight-year-old in grade three and a nine-year-old in grade four. Connect the dots. You should have a straight line. To project into the future, continue your straight line. From this direction line, how do you project a grade level for an eleven-year-old student?

_____

_____

To use this graph for projecting grade levels up to age fourteen, you would need to add space at the top. WHY?

_____

_____

In your next problem you will complete the chart below and then you will construct a graph showing population trends for a city named Alpha. Read the information and find the correct population figures for each tenth year.

You live in Alpha, a city that incorporated with 2,000 residents in 1920. As the chart will show, there have been population increases or decreases for each ten-year period.

The current officials want population projections because they must plan for future housing and water needs. They have asked you to complete the growth chart and then create a graph which will show past growth patterns and future trends.

Determine the population projections based on the information presented. Start with 1930.

1. Multiply the population of the last decade (1920) by the percentage-of-growth figure (10%).
2. Add this figure (200) to the last decade's population.

Write this new population total (2,200) in the last column.

Continue this process with the ensuing decades, using the same three steps. Write your responses in the correct columns. (The completed graph can be found on page 7.)

ALPHA, PAST GROWTH AND FUTURE PROJECTION

	Year	*Percentage Of Growth*	*Change In No. Of People*	*New Population Figures*
PAST	1920	New City	---	2,000
	1930	10%	200	2,200
	1940	14%	308	2,508
	1950	84%	2,107	4,615
	1960	minus 12%	minus 554	_____
	1970	minus 7%	minus 284	_____
	1980	6%	_____	_____
CURRENT	1990	8%	_____	_____
FUTURE	2000	7%	_____	_____
	2010	5%	_____	_____
	2020	4%	_____	_____

What was Alpha's peak population before 1990? _____

How many people will live in Alpha in 2020? _____

Do you think that some of the homes built in 1920 could still be used in 2020? _____

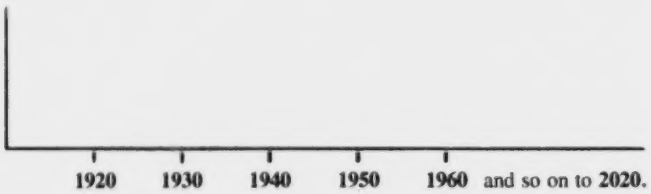
Many homes were built in the 1940's for workers at a military supply center. How many of those homes might still be in use in 2020? _____

How many new homes will be needed in Alpha by 2020? _____ (Do not count any existing homes needing to be replaced.)

The Reference Section includes a sample blank graph for your next population-growth problem in Alpha. Make a copy of the graph and label the BASE/TIME and the QUANTITY LINES.

Mark the BASE/TIME LINE into eleven equal sections and the QUANTITY LINE into twelve. The BASE/TIME LINE shows decades. The QUANTITY LINE represents population increments. You will develop a TREND, or direction, LINE on your graph.

Below the BASE/TIME LINE under the first of the eleven marks, write **1920.** Write **1930** under the second mark, **1940** under the third, and so on. Continue writing these decade dates to **2020.** You may wish to turn these dates sideways. Your BASE/TIME LINE will look like this:



Now turn to the QUANTITY LINE. In this instance, it is a measure of population growth. Write 500 to the left of the lowest mark and add 500 increments until you reach 6,000.

The next step is to place on the graph dots that will represent figures from your chart. Your first task is to place a dot which will represent 2,000 people living in Alpha in 1920. Place your left finger on the number 2,000 on the QUANTITY LINE. Then move your finger to the right until it is directly over the year 1920 on the BASE/TIME LINE. Mark a dot at that point. Follow this procedure for each dot that will represent the population of Alpha in a particular decade.

Group discussion questions:

Was the trend, or direction, line for your chart always up, or did it drop in any of the years of your chart?

From your graph, which ten-year periods showed a negative population rate?

You can be reasonably sure of accuracy for the years up to 1990, but how accurate can you be for 1990 to 2020?

What might a new discovery of uranium or some other precious commodity do to population trends already projected for 2000, 2010 and 2020? In what period did Alpha experience a boomtown period when the population increased by 84%? What caused the increase?

Look at the graph. Not including the one unusual period, has there been a steady, if slow, overall increase in the population of Alpha during the years covered in your study?

Share your graph with others. You should have a jagged line indicating increases and decreases. If you have a straight line, get some help. Compare your figures with those of others in your class.

You have looked at growth patterns for Alpha in each decade since 1920 and at projections for Alpha up to 2020. Futurists try to anticipate and understand growth patterns and the reasons for them. Those reasons include birth rates, longer life spans, better health programs and immigration. WRITE your ideas concerning growth rates in 2020. Will they be different from those in 1950 or 1970? Share your thoughts with your class.

Another type of graph is a bar graph. An example and description are found in your Reference Section. Bar graphs are often used as charts that people can understand easily. The bars can be colored to illustrate specific times or quantities.

Characteristics of Trend Extrapolation Graphs

A. Trend extrapolation can be "no-growth" or it can be "linear."

B. In a no-growth pattern the direction, or trend, line remains parallel to the base line as it moves to the right through the time periods.

C. In a linear growth pattern, the trend line moves away from the base line as it moves to the right.

D. Trend lines, either no-growth or linear, can develop smoothly, but more likely will show ups and downs, above and below an imaginary average trend line.

E. Some graphs have no definite patterns.

F. Intervals on both the vertical and the base lines may be measured at any length appropriate to the needs of your projection. Those on the vertical line must be the same length, as must those on the base line. However, the intervals for the vertical line do not have to be the same as those for the base line.

On another paper WRITE out your ideas about how you might use a trend extrapolation graph in a report. File it for later use when you are making reports.

Use trend extrapolation with caution. Look for other factors that could affect your findings. Political or social situations could cause changes in your trends. LIST other factors that might affect your projections.

_____

_____

_____

_____

_____

RESEARCH
DEBATES
SURVEYS
REPORTS

Finding and Reporting Your Research

Because you like to be involved in programs that can help you understand changes taking place in your world today, activities in ***Future Options Unlimited*** are generally action oriented. A basic intent of the book is that you can conduct your own research with help from your workbook, your teachers, and your classmates.

GROUP/INDIVIDUAL RESEARCH

Your studies will range from one-person projects to group and class activities determined and conducted by the students. In any size group or project, an important task is the development of an investigative procedure, a plan which involves more effort and purpose than copying selected items from interesting resource materials.

FILL IN the blanks in the following practice research plan. Your serious responses here can be used again in later assignments.

1. SELECT a specific future-related topic, such as Population, Energy, Space, or Transportation.

   _____

2. LOCATE and RECORD information about your topic from books, people, and other sources. Start with three here and add others in your journal.

Information Sources: People, Books, Periodicals, and Other Materials	***Short Description About the Information for Your Reference and Recall***
_____	_____
_____	_____
_____	_____

3. WRITE three or four major questions about your topic that you can refer to as you work on your project. The questions at the beginning of each work unit in your book are good examples. Check with your teacher for approval of your topic and questions. LIST your questions.

   _____

   _____

   _____

   _____

4. What RESEARCH ACTIVITIES will you use with your project? See the Research and Report Topics section in this chapter for suggestions.

5. As you do your research, CHECK your questions often as a guide to your purposes and direction.

6. With the findings of your research in front of you, make an outline that you can use for writing your report. Which should you describe first: the project or the results? Should you make any charts, tables, or diagrams to use with your report?

7. WRITE your report from your outline. Refer to your journal notes. Make a courtesy copy of your report for your teacher if you are making an oral report.

8. PRESENT your report, written or oral, as agreed upon with your teacher. (If it is a group report, involve several members in presenting it.)

REPORT PLAN

Title: _____

Presenters: _____

Major points for emphasis: _____

_____

_____

_____

_____

Your personal conclusions regarding the research and the report: _____

_____

_____

_____

_____

_____

USING SURVEYS IN RESEARCH

A research survey is an examination of a concern using viewpoints of many people. The same question, or set of questions, is presented to people on an individual basis. When they have responded, their opinions are tabulated into a series of results, which becomes the basis for your report. Surveys can be conducted by correspondence, personalized interviews, or in some group situations.

Begin your first survey with only a few simple questions. Talk with people that you already know. Be sure that you write their responses accurately. Tabulate and report your findings to your class.

Survey instruments can range from "yes-no" and "true-false" through "multiple choice" and "open-ended" questions. A yes-no question might ask, "Are you concerned about increasing energy needs in today's world?" A multiple-choice question could ask people for their opinions about future-related concerns, such as the most acceptable limits for world population at 5, 10, 12, or 15 billion people. The following is an example of an open-ended question: "In twenty-five years the two most profound changes in our society will be _____ and _____." Many survey instruments will include several kinds of questions.

Based on stated purposes, survey samples can range in size from a few people to thousands. Elections might be considered a form of yes-no or multiple-choice survey in which voters express approval or disapproval for candidates or propositions. HOW would this kind of voting survey make it easier to count ballots and announce the results?

_____

_____

Think about the true-false tests you have experienced in school. When your teachers gave everyone the same questions to answer, were they actually surveying how well each of the students had learned their assignments?

_____

After success with surveys in your class or with family members, try one that will include people outside your class. Ask students not in your program for their ideas on a concern that you are studying. Include with your questions a brief description about your survey (i.e., that it is a part of a study dealing with aspects of living in a changing future). Identify those aspects for your survey group. Try different kinds of questions in your survey.

Another survey might take place out in your community with people outside your school. Be sure you clear your activity and survey questions with your teacher before conducting any surveys in shopping centers, libraries, or other areas away from school.

In all surveys, the results should be tabulated and evaluated by the research group and then reported to your teacher and your class. Know your survey results well enough that you will have no problems in responding to questions from your audience group.

USING THINKING-SKILL (PROCESS) VERBS IN RESEARCH

LOOK in the Reference Section for the listings of thinking-skill (process) verbs. The separate lists represent different levels of understanding for reporting your research. As you become familiar with all levels of these verbs, you will find less need to copy materials and your reports will be more interesting and understandable.

For your report preparation, compare verbs from each list to see which level gives you the most appropriate meaning or intent for your project.

ORAL AND WRITTEN REPORTS

All reports must be written. Refer to items 6, 7, and 8 under Group/Individual Research for steps to follow in the development of your written report. Some of your reports will also be oral. Available class time and the length of time allotted to your course will partially determine the number of oral reports for each student. You will be expected to make one or more oral presentations to your class.

The oral report is important as it combines many basic learning techniques—outlining, research, public speaking, listening, and discussions—with an exciting and important future-related topic.

When you give your oral report, know your topic and your materials well enough that you have no need to read from your written copy. Keep eye contact with your audience. Use charts and graphs to help explain your findings and your conclusions. Refer to your outline only to help keep you on your subject.

You and the members of your class will serve as evaluators for students giving oral reports. As you listen to them, take notes so you can ask questions when the report is finished. You may want to make comments or observations. Your serious comments could be directed to the content of the report or to the delivery by the presenter. You might refer to the clarity of the presentation; the value of the charts, materials and ideas used; and the overall quality of the report.

As you evaluate, look for these factors:

1. logical organization;
2. transmission of information;
3. eye contact between the speaker and the audience;
4. speaker poise and acceptable vocabulary; and
5. speaker response in the question-and-answer period.

Keep these factors in mind also for the times that you are the presenter.

DEBATES FOR REPORTING FUTURE-RELATED IDEAS

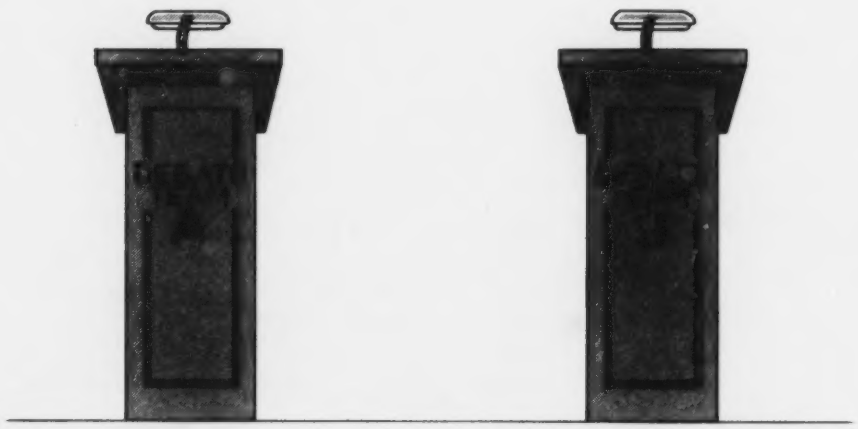
Debates are discussions in which one team argues affirmatively in favor of a stated resolution and a second team argues against it. They give students the opportunity to state and defend their beliefs concerning stated topics. You will recognize the formal proposition of a debate topic in the following manner. RESOLVED: Future Studies is a serious need in the junior-high-school curriculum. Team "A" agrees with the proposition; Team "B" is opposed. The teams also have rebuttal time opposing conclusions by the other group.

Debate teams have one to three speakers from a group that collects and organizes the debate materials and information. In the first presentation the affirmative team goes first, alternating by turns with members of the opposition. In rebuttal, the opposition is first. Three-minute talks and one-minute rebuttals by each speaker might be very suitable for your debates. Plan also that members of the audience will ask questions of the debaters.

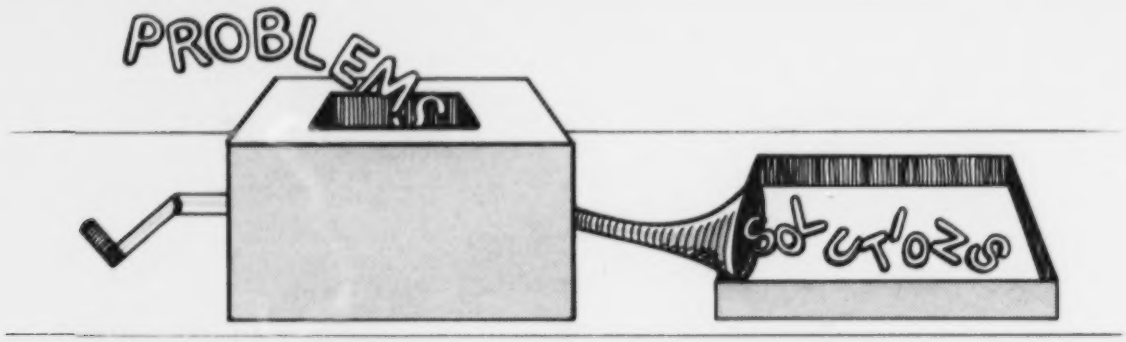
The first presenters for each team introduce the subject according to concepts based on their research. The next speakers provide supporting views and information. The final presenters should be very strong debaters who can summarize their team's statement. In the rebuttal, each speaker tries to point out the weaknesses of the other team's arguments as related to the strengths of his/her own team's arguments.

Judges award points to individual debaters. At the end of a debate, all judges' scores are tallied to find the highest number of points for each person and each team. Real winners in debates are audience members who can listen and learn from results of research from two teams with opposing viewpoints about a specific future-related topic. Students will serve as judges. Your teacher will ask some class members for their judging scores after each debate.

WRITE on another paper your ideas for judging a debater. Refer to the list of five factors by which to evaluate an oral report in the Oral and Written Reports section for suggestions. On the same paper, LIST two topics that would make good future-related debates.



SUGGESTIONS FOR RESEARCH AND REPORT TOPICS



The following ideas, in addition to your own, will help you get started with your own projects.

1. Refer to the section in this workbook entitled "What Some Futurists Have Said." Several project ideas are suggested. Select one or more ideas for your project.

2. Write letters to influential people describing your concerns and ideas about a future topic. Those people could include government officials, editors of local newspapers, school board members, city council members, teachers, and school principals.

3. Interview people regarding the creation of a better future. Plan those questions carefully.

4. Develop an opinionnaire survey with about five or six questions related to specific future-related ideas. Take your survey to friends, family, and neighbors to get their opinions. Tabulate their responses into a report.

5. Create dioramas, models, or murals depicting some future-oriented interests or concerns.

6. Develop a slide presentation about the need to plan now for a better tomorrow.

7. Put together a flyer describing the need for future-related conservation practices.

8. Organize a student-futurist club. Plan meetings and activities related to future study. Write to other futurist groups for information about their activities and programs.

9. Compose a mock newspaper ad, one that would cover most of a page in your school or local newspaper. In your ad, invite volunteers to be space pioneers for your space exploration company. Tell your readers what you explore, what living conditions would be, and what basic compensation and benefits they might expect.

10. Write a scenario or a story about living in your favorite city or town in 2035.

11. Compile and edit a book of student reports complete with a title, table of contents, and the reports.

12. Plan and edit a student-futurist newsletter.

WRITE some of your ideas for future-related projects.

13. _____

_____

_____

14. _____

_____

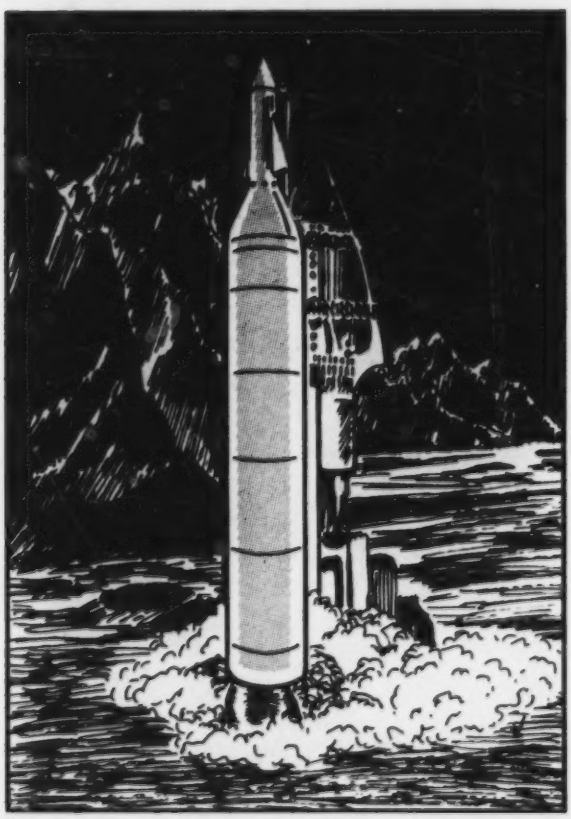
_____

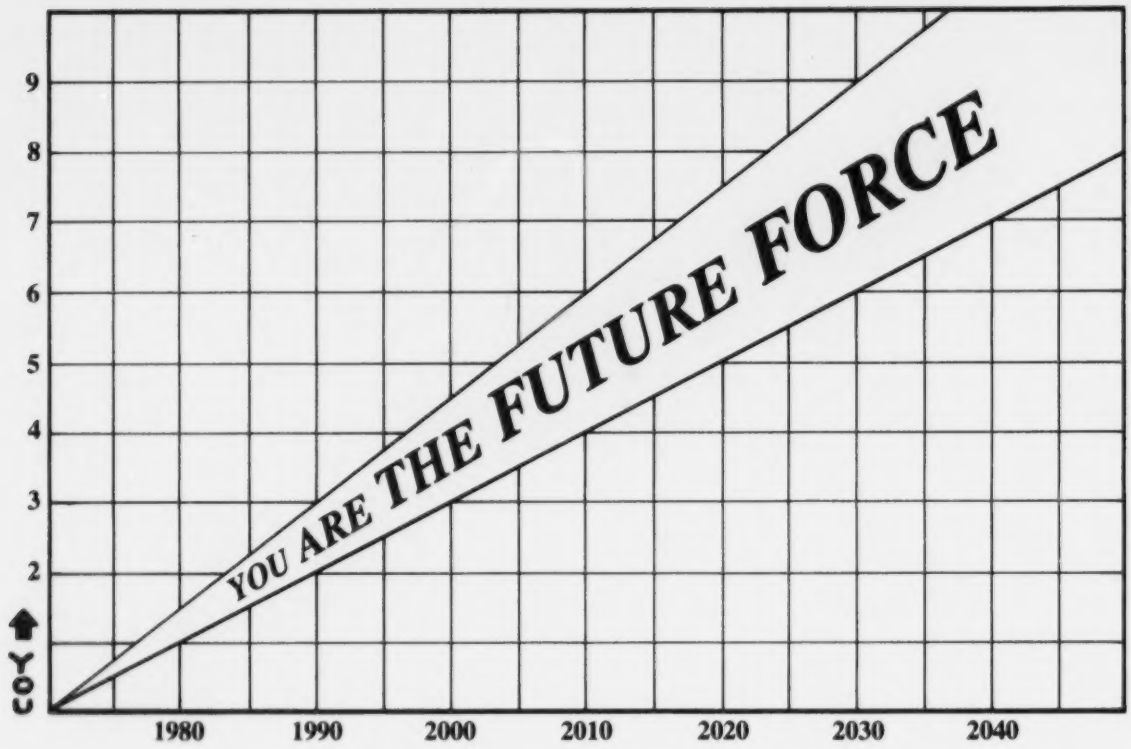
15. _____

_____

_____

As you develop your projects and ideas about the future, keep in mind that it is YOUR future, YOUR tomorrow!





FUTURE AWARENESS

YOUR introduction to the study units

Future Awareness Test

IS YOUR FUTURE ALREADY HERE? ***Yes*** ____ ***No*** ____ ***Maybe*** ____

Write "True" or "False" in the spaces in front of each statement according to your beliefs or understandings.

_____ 1. Nearly all schools in the United States now have computers, but most schools do not have them as tools of instruction.

_____ 2. Technologies that study earthquakes are also available to monitor underground nuclear weapons testing.

_____ 3. The number of travel agencies will increase by 44% within the next five years.

_____ 4. Stepfamilies are the most rapidly growing family type in the United States, and the trend is likely to continue into the next century.

_____ 5. People entering the work force today will change their occupations at least four or five times in their working careers.

_____ 6. Millions of people alive in 1990 will still be alive in 2090.

_____ 7. Latchkey kids who come home consistently to an empty home are more likely to use alcohol, tobacco and marajuana regardless of the economic situation of the home.

_____ 8. More than six million Americans use electronic mail and that number will triple before the 21st century.

_____ 9. Within ten to fifteen years, brain grafts of healthy tissues may be used as a cure for chemically-caused disorders of the brain.

_____ 10. Canada, Japan and nine European nations are actively involved with the United States in a proposed NASA space station.

_____ 11. By the year 2000, drugstore shelves will be jammed with powerful medicines that will be purchased without a prescription. These will include drugs that will be effective for treating ulcers, acne, asthma, allergies and so on.

_____ 12. Many companies have active educational and training programs for dealing with ethics in the workplace.

_____ 13. College courses for people over sixty are available and offered in more than 1,000 schools in the United States.

_____ 14. All statements above are true.

Future FORCE

Welcome to Your FUTURE!

ATTACH A PHOTOGRAPH OF YOURSELF in the box at the right. WRITE your name at the bottom of the picture.

You have just identified an important futurist person who will live a different and rapidly changing tomorrow.

FUTURE FORCE will introduce you to new concepts, terminology, and research about your future world. Activities in FUTURE FORCE focus on actual and potential situations and statistics. Materials you develop and discover will help you plan your school and work programs in the future.

You will need to make choices for your changing future. As you learn about trends, research, and potential planning for the future, you will become more qualified to make decisions that will affect your adult life, family, and future work.

A. LIFE SPANS

In what year will you reach 27 years? _____ 45 years? _____ 102 years? _____

Do you think that people born about the time you were born could live to 140 years of age? _____

In what year would you reach 140 years? _____

WRITE on a separate paper ten health and medical technologies which you have heard about that could extend the life span of people. You might start with recent artificial heart successes. Compare your list with those of others in the class. Perhaps the class could develop a list of fifty to one hundred recent health technologies.

B. WORK AND LEISURE

In Section A you projected your age for three dates in your future. Select one of those dates and tell about the kind of work or leisure activities you might be doing at that time. Before you respond, discuss with others in your group the kinds of work and recreation common in the 1990's that might not be available or possible in your selected year.

Year: _____ Your age then: _____

Projected work or other activity: _____

_____

_____

_____

C. HOUSING

Choose a second date from your projections in Section A. Describe living accomodations that you expect to see in that year. What furniture and furnishings will you have in your home?

Year: _____ Your age then: _____

Your ideas about that future housing: _____

_____

_____

_____

D. TRANSPORTATION

The third date is for your concepts about transportation in your future. How will you get to work? How will you travel while on vacation? What kinds of fuel will you use in your own vehicle? What will your car or other vehicle be like?

Year: _____ Your age then: _____

Your projections about cars and travel: _____

_____

_____

_____

Review your responses to Sections B, C, and D. What new ideas are you developing regarding your own changing future?

_____

_____

_____

_____

E. VOCABULARY

The following words are often used in futurist research and reporting. Some are new while others are old words with new meanings or connotations. Which are familiar to you? On another paper WRITE statements using the twelve words to expand your own thoughts about the future. Use the glossary in the Reference Section for help with definitions of some of them. If you use a dictionary, be sure that it is a recent edition, one which will be more likely to have new words and meanings.

__ Forecast	__ Laser	__ Prediction	__ Scenario
__ Futurics	__ Methanol	__ Projection	__ Space Colony
__ Future Shock	__ People-mover	__ Satellite	__ Trend

F. HUMAN VALUES: TWO BIRTHDAY PARTIES

Situation 1: It is the present. A favorite relative or friend will be eighty-six years old soon. You want to plan a party in honor of that person.

Name the person for whom the party will be held. _____

Where and when will the party be held? _____

_____

What activities will you plan? _____

_____

_____

_____

_____

DESCRIBE your plans for the party on another paper. Who will be invited and what refreshments will be served? Will all of your guests be active? Keep your plans in your journal for a possible class party.

Situation 2: Another birthday party! This one is for YOU! Your party for your friend's eighty-sixth birthday was very successful. Turn the calendar ahead to 2065. You will be the honoree at your _____ birthday party.

Who should be invited? What games and refreshments would you prefer? On another paper WRITE your suggestions for your party. Perhaps you and other class members would like to plan a 2065 birthday party as one of your future force activities. PUT your suggestions in your journal. Describe how the second party would be different from the one you planned for your fifteenth birthday back in the twentieth century.

G. THINKING ABOUT YOUR FUTURE

What do you consider the advantages to you of studying the future now rather than waiting for it to happen? How will a study of future concepts and trends help you make plans?

_____

_____

_____

_____

H. CONCERNS AND QUESTIONS

You have had a chance to think about yourself and your future. Does it seem important to you to study future concepts and ideas? LIST some of your concerns and questions regarding your plans and preparations for living in your future. Maybe some of those questions will be discussed in your study of ***Future Options Unlimited***.

_____

_____

_____

_____

Note: All answers to the Future Awareness Test at the beginning of this section are true.

It's *Your* Future!

YOU AND YOUR FRIENDS will live in a frustrating and exciting world. Your tomorrows will continually change. Your future will be predictable, yet uncertain. It will be both organized and chaotic. Serious study of this book can help you learn about future concerns, possible alternatives, and trends. That information will be important as you make decisions that will affect the quality of your future life.

Future Options Unlimited is your kind of book. It is a guide to a very important study, "You and Your Life in the Future." It will introduce you to ideas about the future time when you and your friends will be parents, teachers, leaders, and decision makers.

Think ahead. In twenty years what kind of home will you have? Describe your family at that time. What kind of work will you do? What recreation will interest you most?

_____

_____

_____

_____

_____

Most activities in ***Future Options Unlimited*** are organized so that you could develop them independently in small groups or in full-class assignments. Your research will include materials from news media, libraries, computer banks, personal experiences, and observations. Exchange of information with your classmates is suggested and recommended. Because this study deals with your future, your concepts and opinions are expected.

Complete the following statement by writing YOUR idea:

A futurist is a person who _____

_____

_____

You are a futurist. You are going to live in the future. You should learn as much as you can about living in that future. Do you visualize your tomorrow as better than today? _____ Will the quality of your life be enhanced by fingertip sources of energy and by larger, but less costly, living spaces? _____ Will you have adequate security and food? _____ Or perhaps, your future will be compromised by high costs for food, housing, and energy. In an overcrowded world, will you need to share nearly everything? _____

Are you an optimist or a pessimist about your future? _____ Why?_____

_____

_____

_____

_____

Is it possible to predict the future? Is there one great future for all of you or are there separate futures for each? Check the population tables in the Reference Section of this workbook for estimates of past and future population growth. How will our one planet provide living space and food for all those people? What solutions do you consider feasible for overpopulation? What can be done now to understand and anticipate changes in the years ahead?

On a separate paper WRITE your thoughts about the questions above. Add some of your own questions. Expect your answers to include your own ideas and opinions. Save your responses and questions for use in class discussions. Keep them in your journal so you can compare your ideas now with your ideas at a later date.

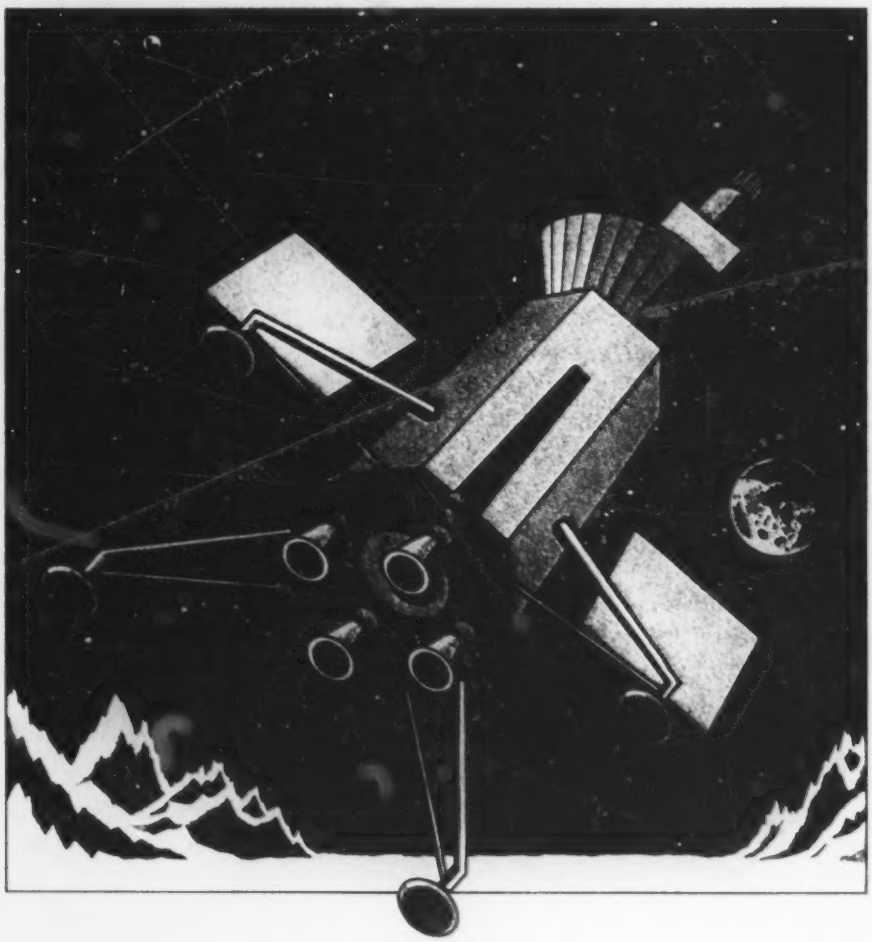
One of your questions might have been, "What is the Future?" Researchers have asked, and tried to answer, that question often. Earl Joseph, the futurist-scientist editor of *Future Trends*, is one who has outlined five basic periods related to the future. His divisions begin with an Immediate Future—a one-year period beginning now—through Near-Term, Middle-Range, and Long-Range Futures, to a Far Future of fifty or more years from present time. A chart with Joseph's time categories is included in the Reference Section of this workbook.

On the same page you will find a second set of future-time projections by Don Glines, a futurist-educator. Note that Glines' chart includes a spectrum, or continuum, which shows the past as well as the future. On another paper, DESCRIBE other ways in which the two charts differ.

Notice also that there is a blank chart into which you can write your own set of future-time concepts. When you develop your own time projections, use your own ideas as well as those from the first two charts.

As you study ***Future Options Unlimited***, you will have opportunities to learn about trends and alternatives related to the future in which you will live. You will be thinking and discussing new ideas regarding problems, challenges, and opportunities in your tomorrow. Your class activities and research will help you look toward your own rapidly changing future.

Look at the three words in the title of your workbook. What ideas do you have as you think about the title and how it might refer specifically to you?



Student Introduction to the Study Units

The following outline of activities and assignments gives you an overall scope for each of the study units. Information gained in earlier assignments will help you in your later projects and reports. There are thirteen or more related activities in each unit.

Keep in mind that the reports and research you produce will stay with you and might be expanded in other classes. Take your activities one at a time and know the sense of accomplishment when your units are completed.

1. The INTRODUCTION to each unit is a series of questions related to a major topic. ANSWER as many as you can. Some are for all students. The middle group is for individual student response and the final questions are for group activities. ADD your questions to reflect your own concerns. Keep your responses and questions for discussions and as a resource for yourself.

2. DEFINE the words in the Words to Know Section. Add them to your dictionary.

3. READ the NEWSPAPER ARTICLES in each unit. The uses of newspaper and periodical items in ***Future Options Unlimited*** are examples of materials and topics readily available to the student-futurist from local news sources. The procedures described in the lessons and assignments can be replicated using other newspapers and other future-oriented news articles. You are encouraged to supplement the items in the workbook with current, updated news stories and materials from your own local newspapers and periodicals.

4. REPLICATE the Reaction to the Articles form on page 114. DESCRIBE your ideas based on what you read in the news items.

5. BE a famous FORECASTER for a day. DESCRIBE what you see as major concerns twenty-five (25) and fifty (50) years into the future, based on your reactions to the news articles. See the Forecasts form on page 115 for more help.

6. Read about graphs on page 113. Show your projections in a graphic form. The time line marks need zero, twenty-five, and fifty years.

7. SELECT a topic related to your study unit for your research activity.

8. DEVELOP your project. Refer to pages 41 and 42 for project ideas and to pages 36 and 37 for suggestions about organizing your work.

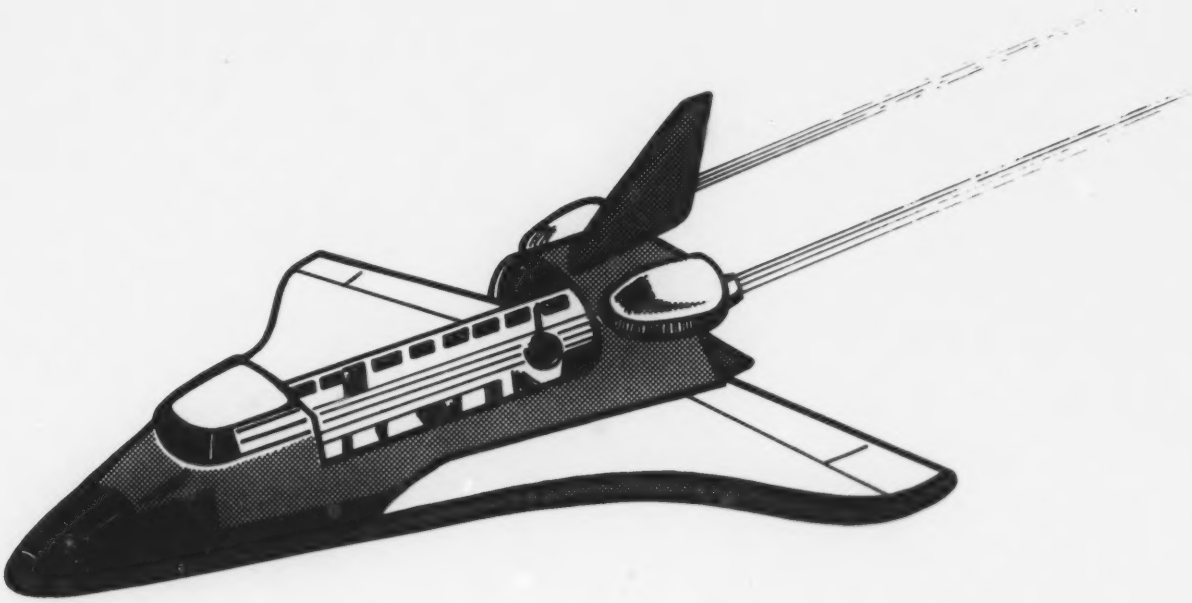
9. PRESENT your report to your teacher and/or your class. All oral reports will include written courtesy copies for your teacher before the presentations are made. For oral reports, the students in the audience will evaluate the materials being presented, the use of terminology, and the poise and knowledge of the presenter. Check the ideas that were discussed on page 39 for evaluating reports.

10. Groups of students in your class will hold some DEBATES. Use the debate questions you find in the debate section of each study unit or construct your own. Approval from your teacher is needed for your questions. Check in your English book, in your library sources, or with your teacher for other ideas about giving debates.

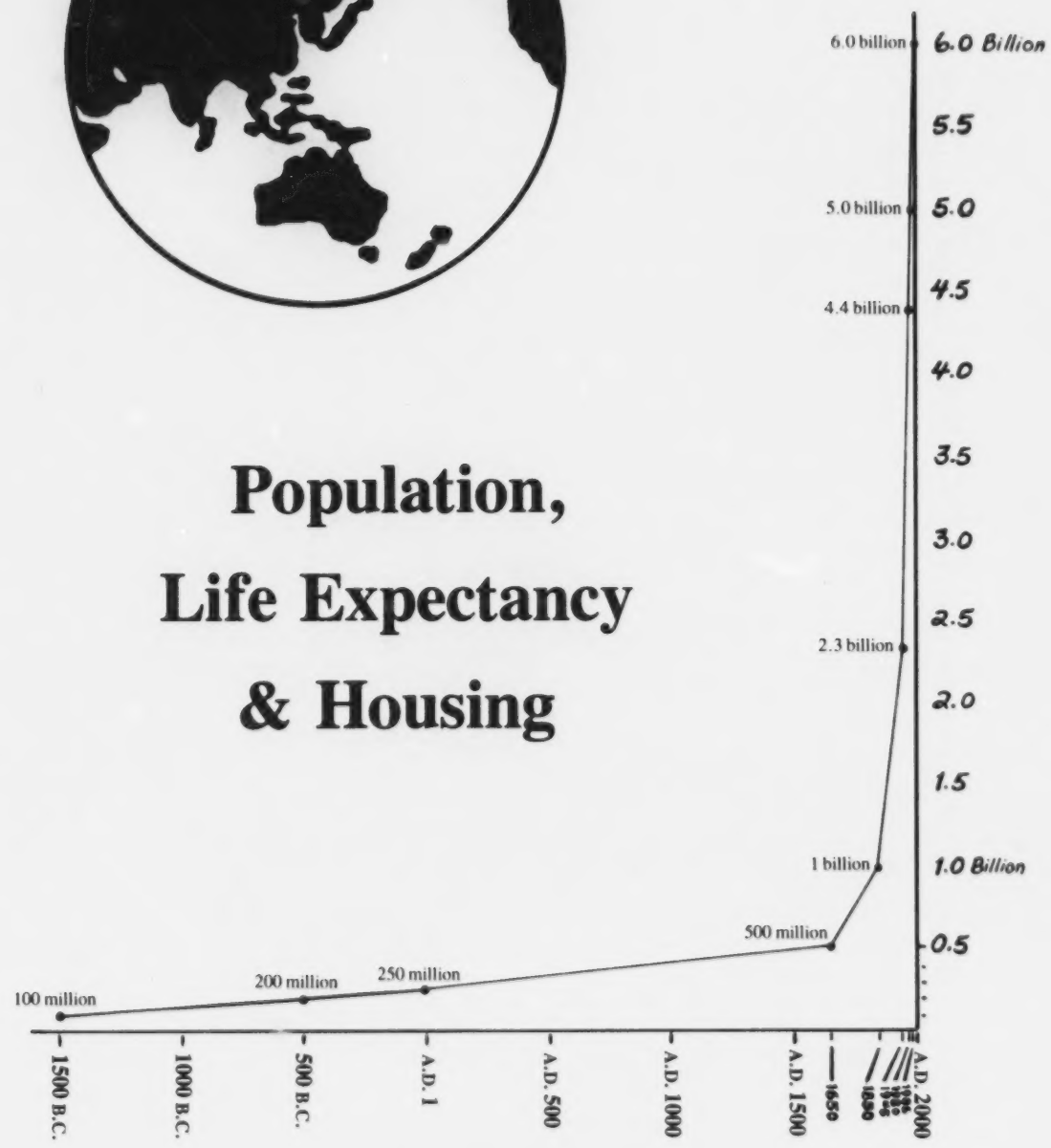
11. Present the results of your SURVEYS or SPECIAL PROJECTS to your teacher and/or your class. Use survey tabulations, graphs, charts, drawings, slides, or other materials that you have developed to help you with your presentation.

12. ASSESS your own involvement in your future. Select a topic such as one of those suggested by questions in the personal assessment assignment of your study unit. Describe your thoughts about the topic and how you have, or have not, made personal changes in your ideas and concepts about what is needed in the future. How will you prepare for that future?

13. This is a class activity in group PROBLEM SOLVING. Select a problem related to the study unit topic and use an evaluation grid to read a solution. See the sample evaluation grid on page 119. Conduct discussions involving the whole class to determine the basic problem to be solved, some alternative solutions, and some criteria for judging the suggested solutions. The full procedure is described in your workbook on pages 26 and 27.



Population, Life Expectancy & Housing



World Population in Billions

Population, Life Expectancy & Housing
Introductory Questions

The population of your world has been increasing at a pace unprecedented in human history. On one hand, agencies in the United Nations and in many countries are developing educational programs to help people understand the need for a slower rate of population growth. At the same time, due to medical and health technologies, more infants and children live to be adults and the average life span for people in all parts of the world continues to grow longer. (See population and life-expectancy charts in the Reference Section.)

Population growth does and will continue to put stress on the potential of the world to provide for all people. You and other students today are faced with future problems related to family size; adequate and appropriate food; and development of alternative kinds of housing, transportation, work and life care. Key questions for you in this study might inlcude "How will we feed them all?" and "Where will they live?"

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop and present a project based on three to five GROUP PROJECT QUESTIONS. All members of the group shall participate in either a written or an oral report.

INFORMATION QUESTIONS

Write your answers to these questions in your journal.

1. The number of people in the world grows larger in several ways and in certain areas. Obviously, more births than deaths is the primary reason for increased population. Write three or four other ways in which population growth takes place in your country. (Check the charts in the Reference Section.)

2. ZPG means Zero Population Growth. (See the definition in the glossary found in the Reference Section.) Many nations in our world have reached zero population growth. Describe what you think are the values and reasons for national or global policies related to zero population growth.

3. How old will you be when you celebrate your grandmother's (or other relative's) 95th birthday? What kinds of foods, activities, and presents would you expect at her party? Describe the people who might come to her party.

4. As the average life span increases in all parts of the world, there will be a larger population of older people in the total population. Older people translates into older voters. What kinds of legislation might we expect to find enacted due to increased numbers of older voters?

5. The United States holds a census every ten years. It is still used, as originally designed, to determine representation to Congress based on population. What other types of beneficial information might come from the census?

6. Most homes are presently built from wood, metal, and/or masonry. As we run out of these traditional materials for building homes, what alternative building materials could you suggest to alleviate future housing problems?

INDIVIDUAL ACTIVITY QUESTIONS

Write the answers to the questions you have selected on separate sheets of paper. Place them in your journal for reference, for help on other reports, and for class discussion.

7. When you reach age 100, how many persons will you be able to include in your family reunion picture? Draw a genealogy chart with you at the top, followed by your children in the second generation section, by your grandchildren in the third generation section, and so on, to include all children born into your family before you reach 100. Use your imagination in choosing children and grandchildren. Ask your teacher or librarian for a sample of a genealogy chart.

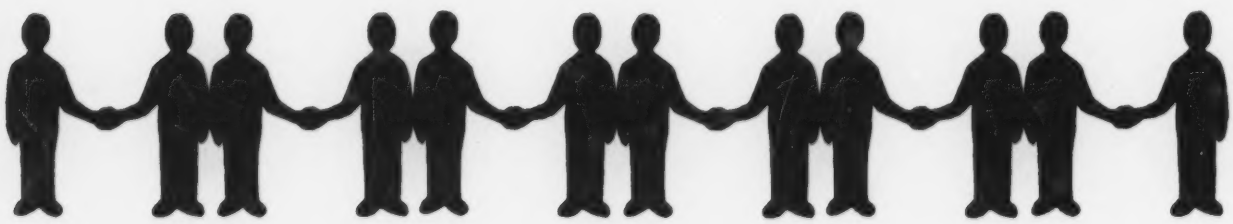
8. Human interest stories in some recent periodicals have described people in various parts of the world who have reached the age of 110 or more. Under what kinds of economical, physical and mental health conditions would you want to live to be 110?

9. As you start the 1990's, average prices for homes have reached from $120,000 to $175,000. Those same homes, if current trends continue, will cost $250,000 and more within the next ten years. Will that affect your plans for owning a home? Where will you live? Some ideas include moving in with parents, sharing homes with others your own age, sharing homes with relatives, living in less preferred areas, and living in areas quite far from work. What ideas do you have for helping people get into suitable housing in your future?

10. Describe some activities that you would like to do at your 110th birthday party.

11. An immediate family with one set of parents and their children is considered a two-generation family. When grandparents **or** grandchildren are added to the family, it becomes a three-generation home. Why would or wouldn't you like to live in a three- or four-generation household? What might be some advantages in this kind of arrangement?

12. How many people live on your block or street? Assuming a population increase of sixteen percent within twenty years, how many persons could be living in that same area? How might housing and living conditions change as a result of a sixteen percent increase in population?



GROUP PROJECT QUESTIONS

Responses to the first twelve questions might be included for use with the group projects.

13. Why should (or shouldn't) nations of the world campaign for fewer births?

14. The poorer three-fourths of the world is increasing in population two to three times as fast as the more affluent nations. What does this mean in terms of food, jobs, care of the elderly, services, and housing in both the poor countries and the affluent ones?

15. What are the most serious implications of population increases where there is insufficient food and housing?

16. What changes would be necessary in your home if it became necessary for other family members to move in with you, such as grandparents, sisters or brothers, and, possibly, their families?

17. The World Population Chart in the Reference Section shows a world population at 750 million during the American Revolution and the first billion just before the American Civil War. On the same chart, world population reached five billion before 1990 and is expected to increase to six, seven and eight billion people early in the 21st century. LIST some economic, health, medical and educational reasons for the dramatic increases in population growth since the time of the American Revolution. Do you think those increases will continue? Why?

18. What serious suggestions can your group make regarding the provision of food, housing, and other needs for your overcrowded future society?

Population, Life Expectancy & Housing
Words to Know

The words that follow are important because they relate to Population, Life Expectancy, and Housing. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. birth rate: _____

2. geriatrics: _____

3. "Grey Power": _____

4. life expectancy: _____

5. megalopolis: _____

6. population bulge: _____

7. population growth rate: _____

8. town house: _____

9. ZPG: _____

Population, Life Expectancy & Housing
News Articles

The first news item projects population estimates for specific cities in the year 2000. These projections are based on present-day trends. The current census for each city named was used to determine the ages and occupations of people in these areas. How many will be the appropriate ages to have children in the next ten years? How many will live near cities with excellent health care? How many will have enough income to take care of all their health needs? Where will they live? How will you meet the challenges of providing food and services for the rapidly growing world in the new century? What learning programs might be developed to help people prepare for living in an overcrowded world? WRITE your responses in your journal for reference and class discussion.

Twentieth century population growth has created new problems related to your future. Your quality of life is threatened by the unprecedented increases in population. STUDY the population tables in your Reference Section. CONSTRUCT two graphs, one showing population in the world since America was discovered and a second showing population in the century of your birth, the 20th century. Project into the 21st century. What trends do you find as you study your graphs?

In this unit you will study trends, alternatives and possible solutions to problems related to rapid population growth. Note that longer life, better health care for infants and for senior citizens, and improved eating habits affect the population increases. Use your Reference Section tables or the graphs you have made to tell how old you will be when the world population reaches eight billion.

No Elbow Room

Cities estimated to be the most populous by the year 2000:

Mexico City	26.3 million
Sao Paulo, Brazil	24.0 million
Tokyo, Japan	17.1 million
Calcutta, India	16.6 million
Bombay, India	16.0 million
New York City	15.5 million
Seoul, Korea	13.5 million
Shanghai	13.5 million

(Excerpted from *USA Today*, January 19, 1990.)

DESCRIBE how some population growth might be attributed to new medical and health technologies and education. LIST other cities you think might have over 10 million people by the year 2000. Note that there are no cities in the news item from Australia, Africa or Europe. Use an atlas to LIST fifteen other large world cities today that are not included in the news item.

LIFE EXPECTANCY IN DEVELOPED COUNTRIES
Centers for Disease Control Ranking of Life Expectancy

Rank/Country	Years	Rank/Country	Years	Rank/Country	Years
1. Japan	79.1	12. France	75.9	23. Luxembourg	74.1
2. Switzerland	77.6	13. W. Germany	75.8	* Portugal	74.1
3. Iceland	77.4	14. Italy	75.5	25. Ireland	73.5
4. Sweden	77.1	15. Israel	75.2	26. E. Germany	73.2
5. Spain	76.6	16. Austria	75.1	27. Bulgaria	71.5
6. Canada	76.5	17. United States	75.1	28. Czechoslovakia	71.0
* Greece	76.5	18. Denmark	74.9	* Poland	71.0
* Netherlands	76.5	19. Finland	74.8	* Yugoslavia	71.0
9. Australia	76.3	* Malta	74.8	31. Romania	69.9
* Norway	76.3	21. Belgium	74.3	32. U.S.S.R.	69.8
* United Kingdom	76.3	22. New Zealand	74.2	33. Hungary	69.7

(Taken from *The San Francisco Chronicle*, April 6, 1990.)

The next item is a life expectancy chart. What do the asterisks mean? Did any of the items surprise you? Refer to the Life Expectancy Chart in the Reference Section. WRITE your ideas about increases in life expectancy in the 20th century.

BEST COPY AVAILABLE

A researcher quoted in the article from which the Life Expectancy in Developed Countries chart was taken suggested that lower life expectancy in Eastern Europe is probably caused by poor health habits. Which countries in the list are from Eastern Europe? The article also points out that in those thirty-three developed countries the biggest killers were heart disease at 30%, cancer at 21% and stroke at 14%. Where can you find information about those illnesses? Where do you find information about life expectancy in countries not covered in this list? Would you expect to find higher or lower life expectancies in countries in Africa, South America or Asia? Why?

The third article reports the concerns of people regarding the number of homes that will be available to them. It suggests that a housing shortage is close. Students in schools today will need to deal with serious problems related to population and housing. According to the article, some areas have had a 45% drop in family home construction while the population increase has continued on the same levels as in the previous few years.

Reasons for caution in the housing market include these from the article: 1) concern about congested roads, sewer systems and schools when homes are built without provision for these needs; 2) the unwillingness of builders to speculate that their houses will be sold within a reasonable time; and 3) a decline in home ownership.

LOOK for articles in your newspapers that describe similar concerns about future housing for the increasing population. WRITE a short report telling about those concerns and how they might affect you.

The fourth news item is more optimistic. It tells about Habitat for Humanity, an organization that is constructing low-cost housing for low-income families. Former President of the United States Jimmy Carter has been active in this project, which has built more than 4,300 homes in 620 cities in 31 countries.

Population Could Outpace Housing

Despite an unusually high number of homes now for sale, the county could face a housing shortage before the end of the current buying season. There are 27% more resale homes than a year ago, and in the new home market developers are offering incentives to attract buyers.

Fewer permits, however, for new homes were authorized last year, even though the population has continued to increase.

(Excerpted from *The San Diego Union*, March 18, 1990.)

Families See Dreams Come True: Homes Completed by Habitat Group

Ninety-seven low-income families—ninety from Mexico and seven from San Diego—have seen their lifetime dreams come true. After more than a year of preparation and a blitz of hard work this week, an international group of more than 1,200 volunteers put finishing touches yesterday on most of the families' new homes.

For families and volunteers, this indeed has been the "Miracle of the Border," as the 1990 Jimmy Carter binational work project has been designated by Habitat for Humanity.

The binational project "shows us that it is possible for Mexicans and Americans to work together for the benefit of those who don't have proper homes," Carter said.

(Excerpted from *The San Diego Tribune*, June 25, 1990.)

In your Reference Section, find information about new alternative construction materials. Then use the following questions as the basis for discussion in your group or in your class.

1. How many trees for the ecology might be saved through the use of styrofoam or other non-wood materials in homes?
2. What other kinds of materials might be used in construction of acceptable homes? Indians used wood and animal skins. Eskimos used ice and snow for homes. Would those materials be acceptable to you today? Why or why not?
3. Would new lightweight building materials be a handicap or a help to construction of new homes?

Population, Life Expectancy & Housing
Study Activities

PHASE I: Reaction to the Articles Relating to Population, Aging, and Housing

Use the form on page 114 of the Reference Section. Your teacher will either provide copies of page 114 or ask you to copy it. Place your written reactions in your notebook.

1. If the events projected in your articles are accurate, how will you be affected?
2. What other articles have you read lately that express concern about population growth and housing in the near future?
3. The obituary pages of local newspapers list many people between the ages of seventy-five and ninety. What do those figures mean for members of your family as they retire from work and move into these advanced ages?
4. What kinds of changes are taking place around you that are related to society's efforts to provide for a population that is growing older?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the form on page 115 in your Reference Section. Your teacher will either provide copies of page 115 or ask you to copy it.

1. How would you provide for members of your family as they reach their eighties?
2. The population of the United States increases every year, as does the cost of homes. What types of living accomodations do you foresee for the future? What kind of assistance might be given to home buyers?
3. What concerns would you project for the time when you are ready to retire?

PHASE II-B: Alternative Futures for an Overpopulated World

Use the form on page 116 in your Reference Section. Your teacher will either provide copies of page 116 or ask you to copy it.

1. Using ideas gained from your news articles and other resources, plan a future that will absorb rapid increases in population.
2. Plan a community with emphasis on facilities for retired people who are a large part of the population.
3. What are your ideas about living in the future and making it a better place for all people?

PHASE III-A: Your Area of Individual and Group Research

Use the form on page 117 in your Reference Section. Your teacher will either provide copies or ask you to copy it.

Refer to the introductory questions at the beginning of this unit. These questions can be a starting point for your area of research. Restate some of the questions if they will provide Focus Questions for your investigation. These are written reports, but, in addition, some of you will be selected to present oral reports as well. Six of you may be excused from this activity if you are members of the two debate teams.

TITLE OF REPORT: _____

DATE OF REPORT: _____

PHASE III-B: Debate

Choose teams of either two or three students to represent the AFFIRMATIVE and NEGATIVE positions. Here are some suggested debate topics:

1. RESOLVED: Governments should develop legislation and enforcement measures to control population increases and to maintain population figures at the last census figures.
2. RESOLVED: The earth can support its population—and perhaps many more—if the proper strategies were developed and energies and monies were channeled into food research.
3. RESOLVED: The federal government should initiate a plan to construct 1 million new low-cost homes to alleviate the housing problem for low- and middle-income families.
4. RESOLVED: The federal government should create a Department of Geriatrics in which leading scientists and doctors would analyze the aging process and attempt to increase the life span.

DEBATE SCHEDULE AND TEAMS

RESOLVED: _____

_____

_____

DATE OF DEBATE: _____

Debate Team #1	**Debate Team #2**
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

PHASE III-C: Individual or Small Group Action Research

Use the Suggestions for Research and Report Topics found on pages 41 and 42 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations.

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 118 of the Research Section. Your teacher will either provide copies or ask you to copy it.

Select one of the following and write your response. Place it in your notebook.

1. This is the year 2013 and you are _____ years old. Describe your extended family, which includes your children and your grandparents.
2. Describe the home you purchased in 2008.

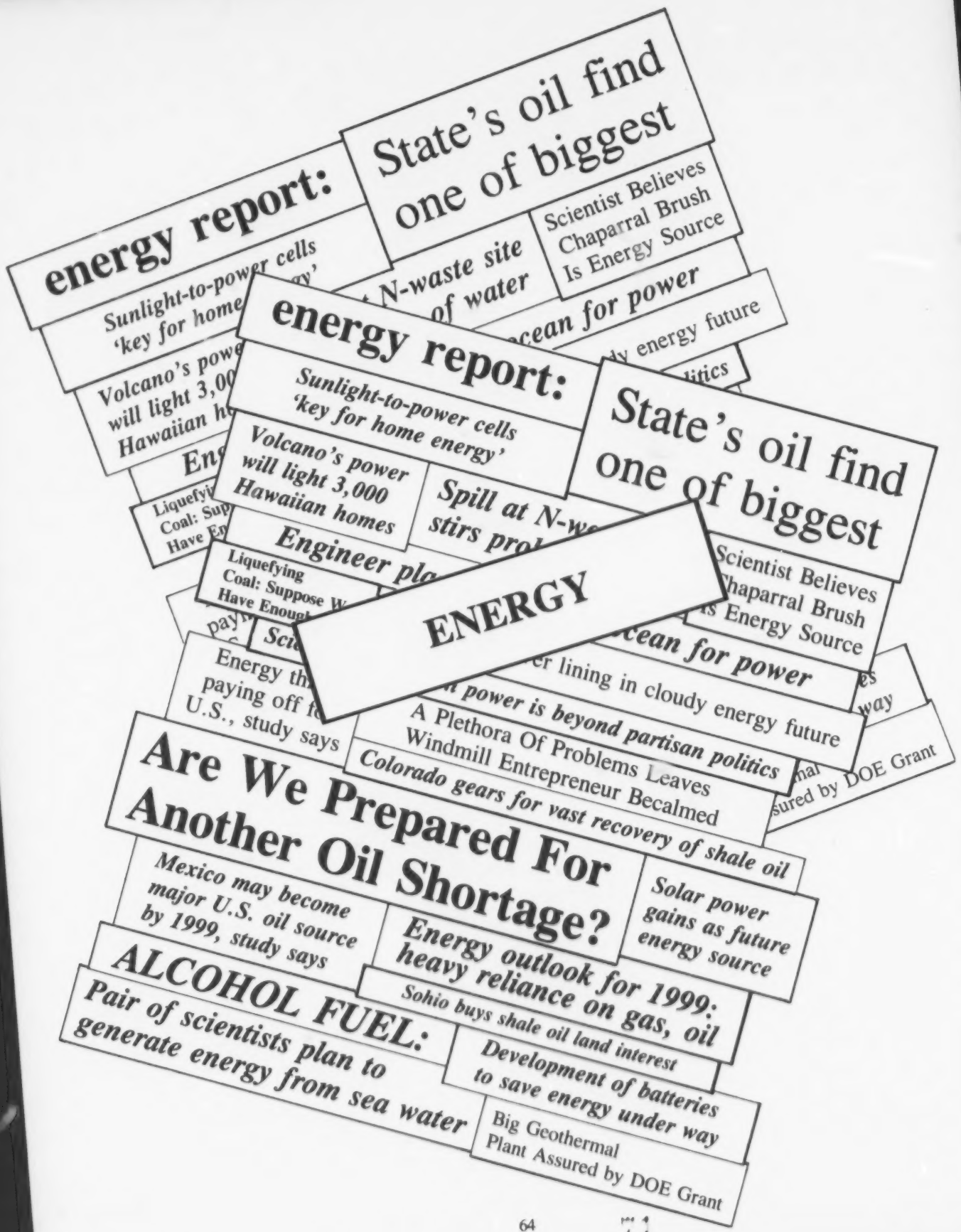
PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 119 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

Select one or more of the following problems. Follow the procedures as given by your teacher to think of new creative solutions and to develop criteria. Choose the most appropriate solutions.

1. In what ways might we provide more (and less expensive) housing for the American public?
2. In what ways might we provide a better lifestyle for the Americans who are sixty-five years of age and older?
3. In what ways might we motivate the American public to strive for ZPG? Or to oppose ZPG?

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.


energy report:
Sunlight-to-power cells 'key for home
State's oil find one of biggest
Scientist Believes Chaparral Brush Is Energy Source
Volcano's power will light 3,00 Hawaiian h
N-waste site of water
ocean for power
energy future
energy report:
Sunlight-to-power cells 'key for home energy'
Volcano's power will light 3,000 Hawaiian homes
Spill at N-w stirs pro
State's oil find one of biggest
Scientist Believes Chaparral Brush Is Energy Source
Engineer pla
Liquefying Coal: Suppose W Have Enough
ENERGY
ocean for power
Energy th paying off f U.S., study says
er lining in cloudy energy future
power is beyond partisan politics
A Plethora Of Problems Leaves Windmill Entrepreneur Becalmed
Colorado gears for vast recovery of shale oil
Are We Prepared For Another Oil Shortage?
Mexico may become major U.S. oil source by 1999, study says
Energy outlook for 1999: heavy reliance on gas, oil
Solar power gains as future energy source
ALCOHOL FUEL:
Pair of scientists plan to generate energy from sea water
Sohio buys shale oil land interest
Development of batteries to save energy under way
Big Geothermal Plant Assured by DOE Grant

Energy
Introductory Questions

Scientists have developed many energy sources. Coal, petroleum, water, geo-thermal, solar, and wind are but a few of them. Many scientists and futurists believe that abundant energy is possible, but some of them insist that the production of some forms of energy might be very expensive and/or dangerous to human health. Certainly there are serious questions concerning the dangers and benefits associated with energy production. In your studies, you might ask other serious questions regarding energy conservation.

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop and present a project based on three to five GROUP PROJECT QUESTIONS. All members of the group shall participate in either a written or an oral report.

INFORMATION QUESTIONS

Write your answers to these questions in your journal.

1. Define the following words in relation to energy.
   a. Solar
   b. Geo-thermal
   c. Fusion and fission
   d. Wind power
   e. Gasahol
2. List some sources of energy other than those listed in question #1.
3. Strip mining for coal is favored by some but opposed by others. Which position would you take? Why?
4. How would windmills produce or save energy?
5. If you wanted to save energy in your home, which appliances would you discard?
6. Make a list of the synthetic fuels with which you are familiar. List the advantages of each. Where will you look for information about synthetic fuels?

INDIVIDUAL ACTIVITY QUESTIONS

Write the answers to the questions you have selected on separate sheets of paper. Place them in your journal for reference, for help on other reports, and for class discussion.

7. Which of the following do you think would be the best ways to conserve energy? Give reasons for your support or criticism of each. Then add two or three recommendations of your own.
   a. Governmental restriction on manufacturers to produce 4- (or less) cylinder cars only
   b. Gasoline rationing as a national policy
   c. Strict enforcement of speed laws through radar and air patrol networks
8. How many uses of solar energy can you find within three blocks of your home or school?
9. Vast oil fields have been discovered in Mexico. How might that affect political or social relations between the United States and Mexico?
10. Projections indicate that costs for energy will continue to increase. In what ways will people need to adjust their standard of living if the projections are correct? How might these adjustments differ for people with fixed incomes as opposed to those whose incomes keep pace with the cost of living? To what extent should government and other agencies help people make those adjustments?

GROUP PROJECT QUESTIONS

Responses to the first ten questions might be included for use with the group projects.

11. A national energy policy would establish goals for use and conservation of energy and set priorities for energy use in times of shortages and emergencies. Some leaders state that the U.S. does not have a viable national energy policy. Have members of your group study and make recommendations for top priorities in the use of energy during calm periods, in the stockpiling of oil, and in the use of energy during crisis situations. Keep in mind that some large entities, such as governments, military units, industries, and agriculture, need considerable power for effective operation, especially in emergencies.
12. Build an electronic cottage. Include in it as many labor-saving devices as possible.
13. List the advantages and the disadvantages of using coal as the primary source of energy in the United States. Investigate ideas such as acid rain, oxides of sulphur and nitrogen, strip-mining, smog, carbon dioxide, and coal resources.
14. Many organizations have opposed certain methods of producing energy. What kind of energy would your class develop that would not evoke protests and criticisms?
15. In your opinion, what is the future of solar energy?
16. As a result of class discussion, one eighth-grade student began using a manual can opener at home instead of an electric one. LIST fifty ways in which people might save electricity.

Energy
Words to Know

The words that follow are important because they relate to Energy. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. chlorofluorocarbons (CFCs): _____
2. electronic cottage: _____
3. environmentalist: _____
4. ethanol: _____
5. fission: _____
6. fusion (hot and cold): _____
7. geothermal power: _____
8. laser: _____
9. liquid hydrogen: _____
10. maser: _____
11. photovoltaic cell: _____
12. solar electric cell: _____
13. solar energy: _____
14. thermonuclear (therm): _____

Energy
News Articles

What will people of the early 21st century use for energy? Should the U.S. government develop and enact an encompassing energy policy for your future? Some recent plans call for the following: (1) opening the Arctic National Wildlife Refuge to oil development; (2) priority construction of natural gas pipelines and nuclear power plants; and (3) an increase of production of oil and gas along some coastal areas of the United States. However, consistent energy guidelines have not been developed.

In February 1991 key senators announced that President Bush's new energy strategy would not be enacted without stronger conservation elements. One area of concern was the amount of oil consumed by the American automobile. Would you prefer a more fuel-efficient, smaller, lighter, less safe car or a heavier, safer car requiring more gas? EXPLAIN your preference on another paper.

In class discussion, EXPLAIN why you agree or disagree with the following: (1) increased oil and gas production in the Arctic National Wildlife Refuge in Alaska and in other coastal areas; (2) construction of new nuclear power plants; (3) the need for automakers to make vehicles more fuel efficient; and (4) stronger conservation measures to conserve oil.

Energy plan hits bumps in Congress

Senators complain it favors production over fuel efficiency

(AP) WASHINGTON—Key senators declared there is no chance for enactment of the new energy strategy unless its conservation elements are stiffened.

Environmentalists as well as a growing number of lawmakers argue that no energy plan will be successful unless automakers are required to make vehicles more fuel-efficient because cars use 40 percent of the country's oil.

Auto industry representatives said. . . that they anticipated some increase in fuel efficiency, but considered Senate legislation calling for cars to meet an average 40 miles per gallon by the year 2000 as "unrealistic" without making cars dramatically smaller, lighter and less safe.

(Excerpted from *The San Diego Union*, Feb. 2, 1991)

The second article announces new support for the existence of "cold" fusion. (LOOK up the term in a recent encyclopedia or dictionary with new scientific terms.)

Imagine the impact on the world's political and economic areas if cheap, safe and inexhaustible energy became available. What would happen in the Middle East, for example, where oil-producing nations heavily depend on foreign oil sales? DISCUSS how relations between all nations might ease or worsen. Also DISCUSS how cheaper sources of energy might affect the American economy. WRITE your serious responses to one of the above questions in your journal.

New life in "cold" fusion theory of energy

Two teams of scientists have new theories and evidence to explain the purported phenomenon [of cold fusion], which but two years ago was hailed as the discovery of the century, but quickly fell into disrepute as too few scientists were able to duplicate the findings.

Moreover, both teams believe the phenomenon will ultimately yield a safe, cheap and virtually inexhaustible form of energy, ending mankind's dependence on oil and other fuels.

(Excerpted from *The New York Times*, April 26, 1991.)

DEVELOP and WRITE four more questions related to the idea of inexpensive energy.

The third article discusses the use of natural gas as an alternative to gasoline in the state of California. Existing vehicles cannot use natural gas unless they undergo a $2,500 to $3,000 conversion that adds different fuel tanks and lines. But once the conversion is made, the natural gas is cheaper and has the potential to eliminate many of Southern California's air-quality problems.

As a class, EXAMINE the benefits and disadvantages of this kind of conversion. DISCUSS whether or not car manufacturers should build cars that have the capability to use natural gas.

One therm of natural gas (equal to one gallon of gasoline) recently sold for 68 cents. How much less is this than the gasoline sold at your neighborhood gas station? If many people began to use natural gas, do you think the price would go up or down? EXPLAIN.

Local gas station first to go natural

First in region to offer natural gas as a low-pollution alternative to gasoline

Southern California's first public service station to offer motorists compressed natural gas opened Thursday amid predictions that it will hasten an era of cheaper, cleaner fuel.

Representatives of the Gas and Electric Company and the service company say they have made the region's first cooperative effort between a utility and an oil company to provide an alternative fuel facility for vehicles. They hope that the installation of the natural gas pump will show the public and Detroit automakers that the fuel can be made available to consumers. . . .

Although there are 30,000 natural gas-powered vehicles in the United States, most are parts of fleets rather than vehicles owned and driven by private citizens.

(Excerpted from *The Los Angeles Times*, San Diego ed., April 26, 1991.)

Energy secretary says needs of environment, economy must be met

The nation's future energy policy must strike a balance between developing the economy and protecting the environment, Secretary of Energy James Watkins said here yesterday.

But that policy will have to rely on a range of energy sources from nuclear to fossil and renewable sources, including solar and wind power, Watkins said in the keynote address of an energy symposium at the San Diego Convention Center.

The department's approach to developing a national energy policy is different from previous attempts because it seeks "integration of environmental and economic policy with energy policy," Watkins said.

(Excerpted from *The San Diego Union*, June 15, 1990.)

Note: This article appears in its entirety in the Reference Section.

On June 14, 1990, U.S. Secretary of Energy James Watkins delivered the keynote address at an energy symposium at the San Diego Convention Center. What do you think he meant when he stated that the nation's future energy policy had to strike a balance between these two objectives: developing the economy and protecting the environment?

The secretary also told of an agreement with the Dept. of Agriculture to pursue a program to raise crops for ethanol fuel. Which crops is he describing? What is ethanol fuel? How will it be used?

Other energy sources mentioned are solar and wind power. Are these sources used in your region? Where would be the best locations for windmills that will generate wind power? LOOK FOR materials that describe these sources.

WRITE your own news item in which you DESCRIBE some alternative fuels in your near future. Refer to the chart on page 108 of your Reference Section for some ideas. Also use library sources, magazines and newspapers. You might include an interview with a representative of your local gas and electric company.

SELECT a name for your paper. Include your school, town or class as part of the name. Then use this heading and WRITE your article on a separate sheet of paper. Be sure to DEVELOP your findings into an article consistent with the title. LIST your sources and dates at the end of the article.

School reporter finds new ideas for fuel and energy in the future

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Energy
Study Activities

PHASE I: Reaction to the Articles Relating to Energy

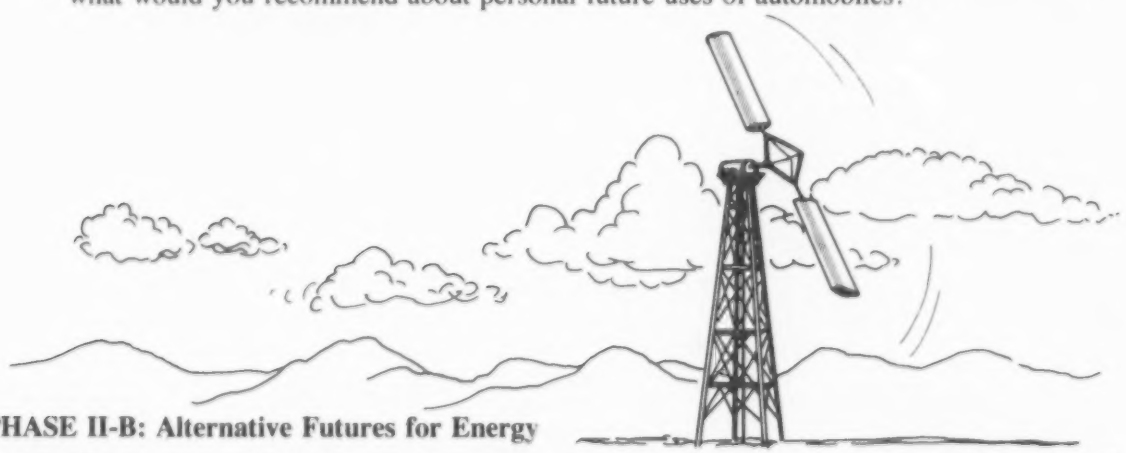
Use the form on page 114 of the Reference Section. Your teacher will either provide copies of page 114 or ask you to copy it. Place your written reactions in your notebook.

1. On a world-wide basis, what kinds of planning and cooperation are needed in terms of providing for adequate energy in the future?
2. Relate the information in the articles to your own experiences regarding energy in your home.
3. What other articles have you read about energy concerns for your future?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the form on page 115 in your Reference Section. Your teacher will either provide copies of page 115 or ask you to copy it.

1. Based on your reactions to the articles, what kinds of forecasts/projections would you make about energy and energy needs in your future?
2. What sources of future energy seem to you to be the most practical for our world? The most impractical?
3. If you were told that the use of gasoline as a fuel for automobiles would end in twenty years, what would you recommend about personal future uses of automobiles?



PHASE II-B: Alternative Futures for Energy

Use the form on page 116 in your Reference Section. Your teacher will either provide copies of page 116 or ask you to copy it.

1. Use the information you gained in Phase I to discuss concerns about future energy sources.
2. As you take a closer look at your future do you think you will enjoy living in that future? Why?

PHASE III-A: Individual and Group Research

Use the form on page 117 in your Reference Section. Your teacher will either provide copies or ask you to copy it.

Refer to the introductory questions at the beginning of this unit. These questions can be a starting point for your research. Restate some of the questions if they will provide Focus Questions for your investigation. These are written reports, but, in addition, some of you will be selected to present oral reports as well. Six of you may be excused from this activity if you are members of the two debate teams.

TITLE OF REPORT: _____

DATE OF REPORT: _____

PHASE III-B: Debate

Choose teams of either two or three students to represent the AFFIRMATIVE and NEGATIVE positions. Here are some suggested debate topics:

1. RESOLVED: Nuclear energy development should be accelerated as soon as possible to provide anticipated energy needs.
2. RESOLVED: Coal should become the major source of energy for the United States in the future.
3. RESOLVED: Governments should assign the highest priorities to solar energy and power development.
4. RESOLVED: No nuclear plants should be built in the United States until nuclear wastes can be stored safely.

DEBATE SCHEDULE AND TEAMS

RESOLVED: _____

_____

_____

DATE OF DEBATE: _____

Debate Team #1

1. _____
2. _____
3. _____

Debate Team #2

1. _____
2. _____
3. _____

PHASE III-C: Individual or Small Group Action Research

Use the Suggestions for Research and Report Topics found on pages 41 and 42 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations.

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 118 of the Research Section. Your teacher will either provide copies or ask you to copy it.

Select one of the following and write your response. Place it in your notebook.

1. Discuss with your family how all of you will adapt to the rising costs of energy.
2. How have your ideas regarding energy changed since the time you began this unit?
3. What active role can you play in the future regarding new concepts of energy?

PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 119 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.

SPACE EXPLORATION & SOCIAL WELFARE
Can the World Afford Both?

Space Exploration & Social Welfare
Introductory Questions

Many people in the world are serious advocates of expanded social welfare programs designed to help the victims of war, hunger, and other disasters. At the same time, many people believe that space exploration programs will ultimately provide solutions to social needs and concerns on earth. A future-oriented responsibility for society might be to determine the extent to which each of these programs should be supported. A critical question for future decision makers is this: Is the alleviation of hunger, homelessness, and poor health in many countries more important (or less important or just as necessary) than space programs that hold a promise of making life and living more worthwhile?

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop and present a project based on three to five GROUP PROJECT QUESTIONS. All members of the group shall participate in either a written or an oral report.

INFORMATION QUESTIONS

Write your answers to these questions in your journal.

1. Through television and other news media, you have become aware of world areas where people experience hunger, protracted illnesses, economic deprivation and lack of personal security. List as many of these areas as you can. Identify the basic types of aid these people need most.

2. Space research has provided many benefits for mankind: heat-resistant materials, dehydrated foods, laser research and other advantages. List additional benefits related to space exploration research.

3. What do you think scientists mean when they suggest that space could provide the world with unlimited sources of energy and power?

4. Why would (or wouldn't) you like to be an astronaut?

5. For what reasons might some people be reluctant, or even fearful, to continue space exploration?

6. Would you rather live on earth and visit friends in Space City Alpha or live in a space colony and visit friends on earth? Why?

INDIVIDUAL ACTIVITY QUESTIONS

Write the answers to the questions you have selected on separate sheets of paper. Place them in your journal for reference, for help on other reports, and for class discussion.

7. You have discovered a new asteroid! What will you do with it? Can you steer it to an orbit above and around Earth? Would you use it for colonization, military defense, communications or mining? What other uses could be made of your asteroid? Did you use visual procedures or a radio-telescope to find it? Where in the solar system was it located? What will you name YOUR asteroid?

8. Locate an astronomy book or use other references such as an encyclopedia. Find the distances between earth and the moon and between earth and the other planets. How long would it take to reach each of those planets via modern rocket ship? Write down your ideas regarding the logistics of space travel to the nearest planet. Include food, clothing, medicines, and schedules.

9. People need to understand and respond to the world's social welfare needs. What educational programs might fill that need?

10. What are your feelings about the prospects of laser-implemented war described in some science fiction novels? Who would survive in a space war?

GROUP PROJECT QUESTIONS

Responses to the first ten questions might be included for use with the group projects.

11. What would your group consider the main advantages—social and economic—of having space cities and colonies? What might be the advantages of locating your space city in an L-5 area (defined in glossary)?

12. A recent newspaper photo showed a small girl and her younger brother in a refugee camp in another country. The story with the picture stated that she had no close relatives and no home. She gathered grains and crumbs for her brother and herself to share. Why might she and others in a similar situation be more interested in social welfare programs as opposed to space research programs? Under what conditions could she support space research programs?

13. Why hasn't modern agricultural technology been able to overcome food shortages in certain parts of the world? Part of this answer might include the following kinds of problems: political, storage, transportation, and profit.

14. What are the implications for the educational curriculum if educators want to respond to space exploration? What changes might be needed in education to accomodate the future needs of space engineers, pioneers, and settlers?

15. Invent an agency to have control over space satellites. Define its functions, authority and responsibilites. Should the moon, other planets and natural satellites be included under the auspices of your proposed agency? Why or why not?

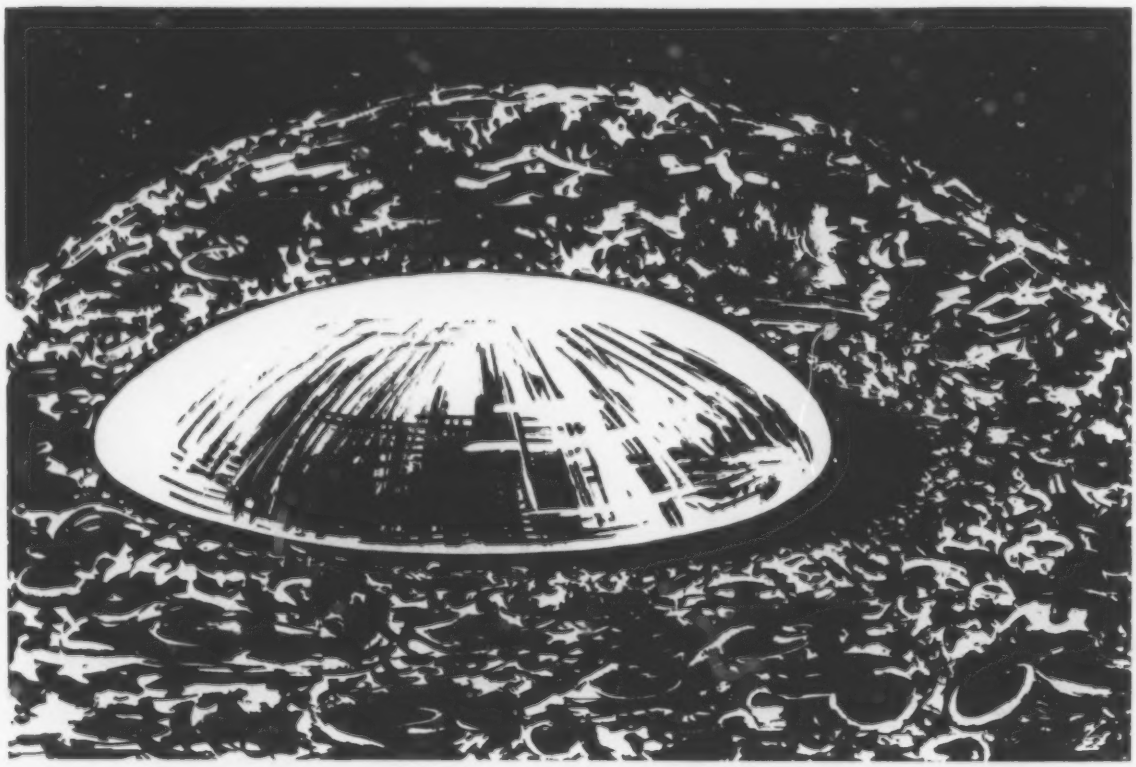
16. For what reasons might people choose to live in space cities? (Social, political, adventure, air quality, or energy needs?)

17. To what extent should mankind develop space colonies and cities in the last few years of the 20th century rather than wait until the middle of the 21st century?

18. What kinds of values and products from space research programs will prove beneficial to all people on earth? Think about medicine, health and communications, among other things, to answer this question.

19. In what ways is space exploration more important than social welfare programs? In what ways is it less important?

20. In order to have money for both social welfare and space exploration programs, should other governmental agencies' budgets be cut or discontinued? Which ones? Why?



Space Exploration and Social Welfare
Words to Know

The words that follow are important because they relate to Space Exploration and Social Welfare. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. asteroid: _____

2. astronaut: _____

3. L-5: _____

4. robot: _____

5. satellite: _____

6. social programs: _____

7. social welfare: _____

8. solar electric cell: _____

9. space city: _____

10. space colony: _____

11. space telescope: _____

Space Exploration & Social Welfare
News Articles

The letter to the editor provides a glimpse at the polarity generated by discussions relating to space-exploration budgets. DESCRIBE the two viewpoints. Do you agree with the writer's position? Why or why not? Name other domestic "ills" that need to be corrected. What do you feel are the two strongest points that could be made by someone supporting the space-exploration position?

A segment of a letter to the *Los Angeles Times*

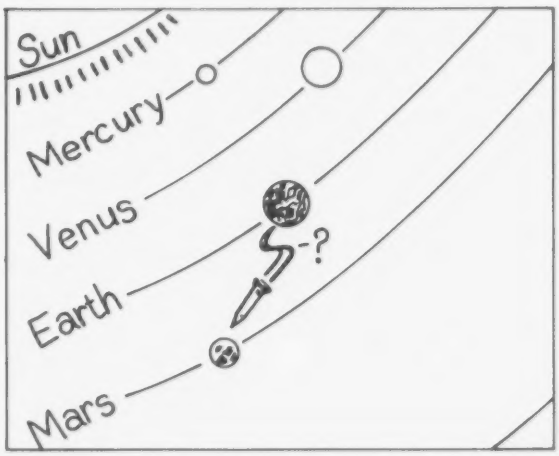
If he [Bush] were to conduct a poll tomorrow stating that given an option of voting $10 billion (an arbitrary figure) to explore Mars or spending that same amount of money to help feed our homeless, provide more treatment centers for alcoholics and other dopers, leave our Medicare budget untouched and provide better care for our indigent elders, I am certain that the voters, cynical, befuddled and uncaring as they often seem to be, would overwhelmingly choose the second option.

What is the point of solving the problem of putting even a regiment of space travelers on Mars when our own domestic problems, typified by violence and dope-dealing and illiteracy, are unsolved?

I do not expect an answer. Just asking...

BEN IRWIN
Studio City

(Excerpted from *The Los Angeles Times*, June 30, 1990.)



Have you ever written a letter to the editor? Select one of the two positions discussed and WRITE a letter to your editor describing your views. Use strong supporting statements.

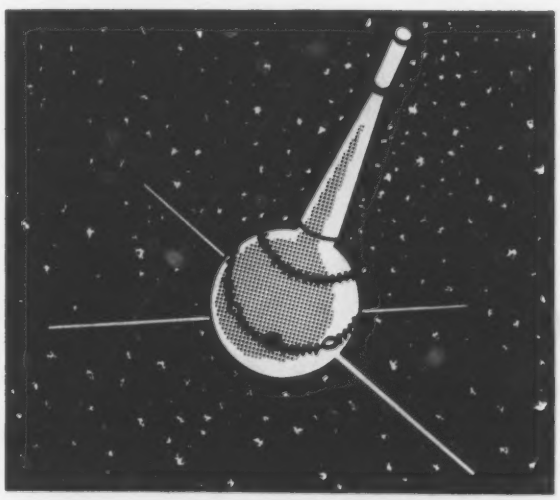
Earthly Goals for Mission in Space

Over the last decade, several problems have emerged that require a multidisciplinary approach. Examples include the increase in atmospheric carbon dioxide, the anticipated depletion of the ozone layer, El Niño-related modifications to weather patterns, and acid precipitation....

The earth-observing satellites launched in the last 25 years have made important contributions to the understanding of our world and the various elements that it comprises. The Earth Observing System will build on this progress.

The EOS mission—lasting up to 15 years—will provide systematic, continuing observations from low Earth orbit. Data gathered through remote-sensing measurements over a decade or more will be assembled in a global database to enable definitive and conclusive studies of energy distribution, water ecosystems, the oceans, ice movements, and the dynamics of the tectonic plates, which are responsible for earthquakes and volcanoes.

(Excerpted from "Earthy Goals for Mission in Space," from *The Futurist*, October 1988, pp. 29-32.)



Is the EOS mission more important than social welfare concerns such as homelessness, job training, new education plants, new roads and highways and increased medical benefits? If you had one billion dollars to spend, how would you divide it between space exploration/observation and social welfare? Or would you allocate all of it to one area?

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The next paragraphs are taken from John Noble Wilford's article, "Becoming Martians: Our Next Great Adventure in Space," which appeared in the June 1990 issue of *Popular Science.*

Visions of terraforming [planetary engineering] have appeared repeatedly in science fiction. In his 1952 novel, *Sands of Mars,* Arthur Clarke imagined human settlers on the planet creating a warmer climate by setting off a nuclear fusion reaction on one of the Martian moons, turning it into a glowing mini-sun. They generated their oxygen with the help of specially designed vegetables. In the sequel, *Fountain of Paradise,* Clarke has a character describe the terraforming principle: "If we could thaw out all that water and carbon dioxide ice, several things would happen: The atmospheric density would increase, until men could work in the open without spacesuits. There would be running water, small seas, and, above all, vegetation—the beginnings of a carefully planned biota. In a couple of centuries, Mars could be another Garden of Eden. It's the only planet in solar system we can transform with known technology. . . ."

Now, we could be on the eve of a new and more ambitious phase of Mars exploration. The Soviet Union is taking steps to lead the way, with bold plans to reconnoiter the planet's surface with cameras, balloons, and remote-controlled roving vehicles. By the end of the 1990's, Soviet space officials hope one of their craft will rocket back to Earth with a sample of Martian soil. The United States has similar plans, but no firm commitment beyond a modest Mars-orbiting mission to be launched in 1992.

Now the long-term objective is not so much to search for life, but to carry life to Mars. Human travel to the planet could begin as early as the year 2010. More important than the timing is the question: Will these first travelers to the beckoning world be Russians or Americans—or Russians and Americans, and perhaps Europeans and Japanese?

Mars, though demythologized and investigated from far and near, is once again challenging the human imagination and intelligence.

(Excerpted from "Becoming Martians: Our Next Great Adventure in Space," from *Popular Science,* June 1990, pp. 100-103, 118.)

The author feels that we are living in a golden age of planetary exploration. This so-called golden age of space exploration has been compared to the voyages and discoveries of Columbus. Do you see any similarities between these two golden ages? Any differences?

Human travel to Mars could begin in 2010. How old will you be? Would you like to be among the first group to travel to the Red Planet? Why? Why do some people consider space explorations, especially those planned for Mars, more important than social welfare questions on Earth, such as helping the homeless, adequate medical care, better educational facilities and aiding the world's hungry? Locate science-fiction novels that deal with Mars. For a special project, READ either *Sands of Mars* or *Fountains of Paradise* and compare it with another writer's concept of Mars.

WRITE a short paragraph explaining "terraforming."

The following paragraphs were taken from Carl Sagan's "The Triumph of Voyager," which appeared in the November 26, 1989, issue of *Parade Magazine.*

In October 1957, we humans launched a machine into space that could orbit the Earth. Now, less than a third of a century later, we have visited the outermost known planet in the Solar System. We have passed beyond the planetary frontiers. We have explored close-up more than 50 worlds.

It's hard, amid the demands of everyday life, to step outside ourselves and grasp the broad historical sweep. But what our species has accomplished in the peaceful exploration of the Solar System is nothing short of mythic and may, in the long run—provided we do not contrive to destroy ourselves first—turn out to be the path to the next stage of human history.

(Excerpted from "The Triumph of Voyager," in *Parade Magazine,* November 26, 1989.)

What are the names of the robot spacecraft that were lauched in 1977 and have, according to Sagan, explored more than 50 worlds? Do you think we are on the brink of an outstanding jump in human history due to the findings that are relayed to us by robot spacecraft? Should we take funds from other projects to fund robot space exploration?

Space Exploration & Social Welfare
Study Activities

PHASE I: Reaction to the Articles Relating to Space Exploration and Social Welfare

Use the form on page 114 of the Reference Section. Your teacher will either provide copies of page 114 or ask you to copy it. Place your written reactions in your notebook.

1. Why would you want to continue space research programs? Why not?
2. You have been asked for recommendations for space-program budgets. How would you spend those funds?
3. What other information have you obtained about the space programs around the world? Include your sources.

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the form on page 115 in your Reference Section. Your teacher will either provide copies of page 115 or ask you to copy it.

1. How might your forecasts for 2005 be different from those for 2075?
2. What projections might you make for future space probes?

PHASE II-B: Alternative Futures for Space Exploration and Social Welfare

Use the form on page 116 in your Reference Section. Your teacher will either provide copies of page 116 or ask you to copy it.

1. Describe a future that will focus on benefits for all people.
2. Society now has a new ingredient: your ideas and your forecasts. How might that new ingredient make our world a better place for everyone?
3. What are your present feelings about living in space?

PHASE III-A: Individual and Group Research

Use the form on page 117 in your Reference Section. Your teacher will either provide copies or ask you to copy it.

Refer to the introductory questions at the beginning of this unit. These questions can be a starting point for your area of research. Restate some of the questions if they will provide Focus Questions for your investigation. These are written reports, but, in addition, some of you will be selected to present oral reports as well. Six of you may be excused from this activity if you are members of the two debate teams.

TITLE OF REPORT: _____

DATE OF REPORT: _____

PHASE III-B: Debate

Choose teams of either two or three students to represent the AFFIRMATIVE and NEGATIVE positions. Here are some suggested debate topics:

1. RESOLVED: The United States should build and establish a space colony as soon as possible.
2. RESOLVED: Earth space is needed more than outer space.
3. RESOLVED: The United States should design and develop cost-free housing units geared to the needs of people over 65.
4. RESOLVED: The two most powerful nations of the world should form a coalition agency to monitor the use of space for peaceful purposes, and at an appropriate time, they should turn that organization over to a United Nations agency.

DEBATE SCHEDULE AND TEAMS

RESOLVED: _____

_____

_____

DATE OF DEBATE: _____

Debate Team #1	**Debate Team #2**
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

PHASE III-C: Individual or Small Group Action Research

Use the Suggestions for Research and Report Topics found on pages 41 and 42 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations.

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 118 of the Research Section. Your teacher will either provide copies or ask you to copy it.

Select one of the following and write your response. Place it in your notebook.

1. Use your notes and your research materials to describe an ideal space city.
2. Examine your journals. Which position is correct: IMPROVE LIFE ON EARTH or EXPAND SATELLITE COLONIES? Or can you have both?

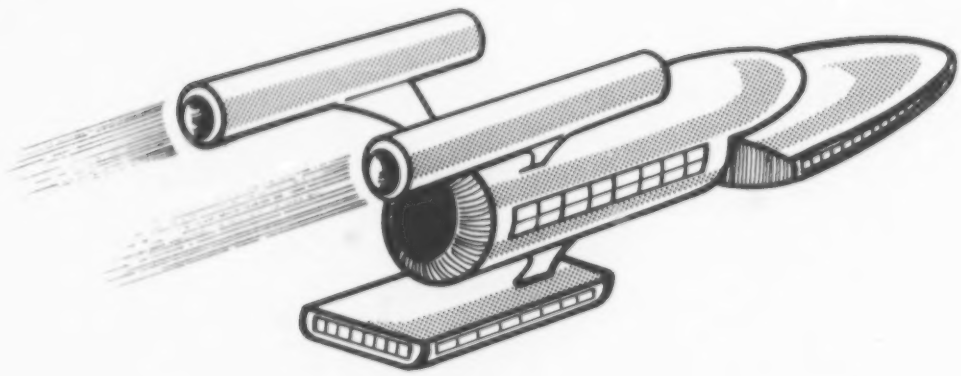
PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 119 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

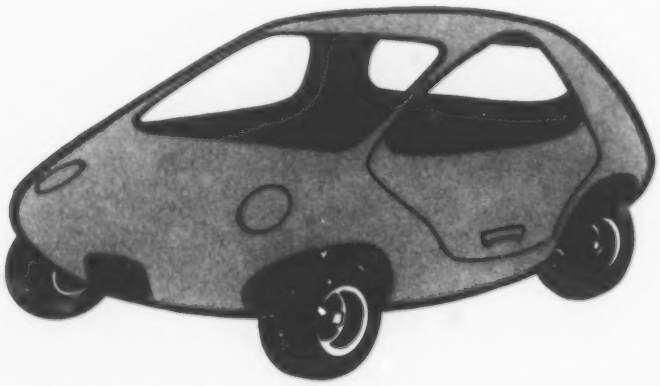
Select one or more of the following problems. Follow the procedures as given by your teacher to think of new creative solutions and to develop criteria. Choose the most appropriate solutions.

1. In what ways might countries participate in shared-space colonies?
2. In what ways could you decide which people to select as your first space colony inhabitants?
3. In what ways might we resolve the conflict between those who argue for additional billions for space research and exploration and those who argue for funds to help the poor, the sick, the unemployed and the handicapped.

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.



TRANSPORTATION & GLOBAL MOBILITY



Transportation & Global Mobility
Introductory Questions

The concept of transportation has many aspects for your consideration. It includes such diverse modes of travel as walking on foot and flying in space shuttles—riding in automobiles and in submarines. Transportation serves to move people, instruments and food over land, on and under water, and through the air.

The Pilgrims spent sixty-five days on the *Mayflower* in 1620, and approximately three hundred years later Charles Lindbergh flew from the United States to France in thirty-three and one-half hours.

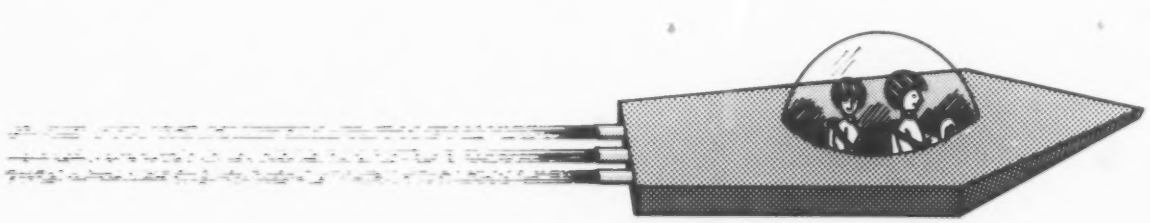
But today aircraft can cross the Atlantic Ocean in two to three hours, and we are all aware of the fantastic speeds achieved by space vehicles.

Many public and private agencies and organizations are moving into alternate fuels, and/or alternate kinds of motors for their vehicles. These fuels and motors are designed to eliminate or lessen harmful emissions put into the air and to improve mileage and dependability of new cars.

Considering recent developments in transportation, perhaps one concern for study in this unit might be the following: Why are people starving when there are food surpluses in many parts of the world? How might transportation systems be used in conjunction with other technologies to alleviate needs and distribute surpluses?

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop and present a project based on three to five GROUP PROJECT QUESTIONS. All members of the group shall participate in either a written or an oral report.



INFORMATION QUESTIONS

Write your answers to these questions in your journal.

1. Use your ideas to describe an ad for an electric car. The ad is to be published in your local newspaper twelve years from now. What items and features, such as batteries or other sources of power, will you highlight in your ad?

2. Eventually you will be able to fly from the west coast of the United States to the east coast in approximately one hour. What additional preparations will be necessary as you plan for one of these coast-to-coast one-hour flights? What kinds of seats and service will you expect?

3. Can you describe your feelings about your first flight in an airplane without a human pilot? How would that differ from your tenth flight without a human pilot? What year was your first flight with a robot pilot?

4. What do you know about PEOPLE MOVERS or PEOPLE-MOVER SYSTEMS? Write a description of how they work.

5. How are large amounts of goods moved efficiently and rapidly from one part of the world to another?

6. What kinds of goods and materials might be transported by ocean freighter in 2019? For what goods and situations might cargo planes be used? How might improved food preservation techniques make differences in food transportation?

INDIVIDUAL ACTIVITY QUESTIONS

Write the answers to the questions you have selected on separate sheets of paper. Place them in your journal for reference, for help on other reports, and for class discussion.

7. Describe how an airplane with no human pilot would take off from Chicago with 374 passengers, fly non-stop across an ocean, and land in Hawaii.

8. What relationships exist between potential future growth of transportation services and the availability of energy and energy sources?

9. When will you buy your first helicopter? How will you use it? List several new uses of helicopters which will help people to live better lives.

10. Describe your trip to Space Colony Omega to visit a relative who lives there. Why would you be transported to an intermediary space depot before going on to Omega?

11. A sensor is a detector. It can measure or sense changes in normal situations, such as distances to objects, how full a gas tank might be, or how rough the road up ahead is. Some sensors can verbalize needs and problems. Can you suggest some sensors for your car or your home that will provide greater safety?

GROUP PROJECT QUESTIONS

Responses to the first eleven questions might be included for use with the group projects.

12. Think of a network of underground tunnels, or tubes, extending across the United States with at least 300 miles between stations. Would this transportation system be used for moving people or only for moving freight? Why? Would this type of system use a robot pilot or a human engineer? What would you consider as speed limitations in an underground system?

13. Draft a newspaper advertisement or a television commercial for a new 2004 automobile. Imagine a visit to a 2004 warehouse which has several cars and describe the features you will place in your ad or commercial.

14. Describe ways in which computers will be used to help truckers arrange shipping schedules and cargo inventories.

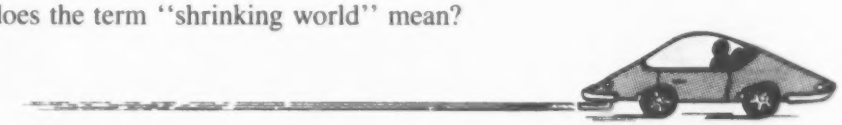
15. Your group has just completed some SPACE FARMING research reports. The members of the group have been invited to move for five or six years to Satellite FS 15 to develop an experimental space farm. Describe how your personal goods will be transported: first from your small town on Earth; then to an artificial island for launching procedures; then to a space transfer depot; and finally, on to FS 15. Describe your trip, keeping in mind that you will be living there for several years.

16. If you were in charge of moving large quantities of food and medical supplies to areas of need in 2010, what kinds of transportation would you use? Consider the speed and the type of materials to be most effective for your purposes.

17. Cartoons are sometimes used in newspapers to emphasize ideas in a humorous way. One cartoon shows an electric-car salesman reminding buyers that the extension cord for their car is only 100 miles long. They would have to return before they reach that distance. Was the cartoonist pointing out a problem or was he just having fun? Draw or describe your own cartoon idea about cars in the future.

18. Recent newspapers have described a plan for a future Trans-Siberian Highway. It would connect with an Alaskan highway, thus providing a continuous route for people to drive from any place in North America to any place in Asia. What advantages and what problems might there be with this highway? When could it be used? What arrangements would be needed between governments? In light of recent political changes in Europe and Russia, how could a Siberian-Alaskan highway would be beneficial?

19. What does the term "shrinking world" mean?



Transportation and Global Mobility
Words to Know

The words that follow are important because they relate to Transportation. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. automatic pilot: _____

2. bullet train: _____

3. electric propulsion: _____

4. freighter (ocean/land): _____

5. global-joint business venture: _____

6. global mobility: _____

7. miles per bushel (vegetable fuel oil): _____

8. people mover: _____

9. sensor: _____

10. shrinking world: _____

Transportation & Global Mobility
News Articles

Transportation, the business of getting goods, people and ideas from place to place, is the subject of this study unit. It is a shrinking world that is looking at the 21st century. You understand that transportation and communication are helping make the world smaller. In each article excerpted and used in this unit, look for the key ideas about people—their lives and their futures.

The first two articles refer to safety of automobiles, highways, airways and people. Your first question will be: How does highway and airline safety relate to the future? Your second question: How will it relate to YOUR future?

Death tolls rise with speed limit

BALTIMORE—Raising the speed limits on rural interstates means more deaths on U.S. roads, new research shows.

A study reported Monday at a national trauma symposium shows traffic deaths jumped about 30 percent...after speed limits rose to 65 mph....Preliminary estimates show it is a nationwide problem: Deaths are up between 20 and 30 percent because of higher speed limits.

(Excerpted from *USA Today*, March 20, 1990.)

The real danger is on the ground

SAN FRANCISCO—The headlines say air travel is dangerous...

The last time I flew, it was almost fatal. It wasn't the pilot, the plane or the air traffic controller that put me in danger. It was the motorist...the airport access road. In heavy rain, weaving through the double-parkers, the driver missed me by millimeters.

What does a frequent flyer do? If I deserted the friendly skies, that would leave me more time for the hostile roads....

One must do more than shrug about an issue as serious as air safety. [There is the] need to wonder [about] large accidents and if they could be prevented.

Even with its flaws, air travel is one of the safest bets in town. That is, if I can only get to the airport in time.

(Excerpted from *USA Today*, guest editorial, January 30, 1990.)

What safer future means of transportation will help you have a longer future? Is airplane travel really safer than ground transportation? How could it be made safer? Why do automobile drivers exceed speed limits? How will people change their driving habits when YOU present them with the data in the first article? In your journal WRITE your ideas about the relationship of the automobile to your future.

With a higher living standard, people in the more developed countries have more leisure time and, therefore, more interest in other countries. Too often the new travelers do not understand the cultures they visit or the eco-systems they might disturb. The third article discusses the need for visitor sensitivity to other lands and peoples.

What did the writer mean by the phrase "trashing of the planet"? To which "World" do you belong? Are you a have or a have-not? What does the First World have that the Third World would like to have?

The savvy traveler

A group of travelers arriving in Goa were met with a group of citizens with protest signs telling them to "Go Home! Mass Tourism Is Destroying Our Society!" This kind of incident in many parts of the world led to the organization of a group concerned about the relationships of tourists and the host people they visit.

Virginia Hadsell is the founder of the North American Coordinating Center for Responsible Tourism, which was formed to help people understand how tourism contributes to the trashing of the planet. At the vanguard of the ecotourism movement, the Center publishes a newsletter and lobbies (with minimal resources) to educate travelers to have a sensitivity to culture and the ecosystems they visit. A major concern is that the destruction is too often aided and abetted by tour operators, resort developers and even the countries that are threatened.

"People need to think hard about what happens when people from the 'first world' go the the Third World, when the haves visit the have-nots," according to Hadsell.

(Condensed from *The Los Angeles Times*, July 1, 1990.)

The world is opening up more and more. That is due in part to increased global interdependence on other parts of the world for materials, goods and supplies. LIST products that are used in your household that come from foreign countries. Are those items also raised or produced in your own country? Are they more expensive when produced in your country?

The last article reports some interesting ideas about the effects of global joint business ventures on international relations. In recorded history, world politics has not done a good job of bringing nations and peoples together, peaceably. The continual growth and improvement of transportation has led to new ideas understandings, misunderstandings, appreciations, learnings and distrusts of other cultures and customs. These international concerns sometimes led to confrontations, piracy and wars.

Because new markets were necessary for the developed countries, however, many companies have become multi-national in scope, to the extent that international boundaries are becoming more blurred than at any time in previous history. Business and economics are succeeding—where governments have not—in bringing people together through economics and interdependence.

In the article, concerns were expressed that some companies buy out their partners after they have become successful. There was also concern that companies might take the new technologies to their home countries. Do you think these are problems? Does it sound better if the American companies are the ones doing the buyouts? Think about the question raised in the excerpted article about the nationality of the automobile designed by Chrysler-Mitsubishi.

? ? ? ? ? ? ? ? ? ? ?

Joint ventures blur national boundaries

NEW YORK—Strategic alliances once referred to the Common Market, OPEC, NATO and the Warsaw Pact. But now they also mean GE-Tundsram, IBM-Siemens and Daimler-Mitsubishi.

International corporate joint ventures, the latest trend in a shrinking world, are redefining economic strengths and increasingly eroding the importance of national boundaries. . . .

The latest catalyst for many joint ventures seems to be a desire to exploit enormous changes in Europe. . . .

What nationality, for example, is a car with a Chrysler nameplate, designed jointly by Chrysler-Mitsubishi and built by Americans at a joint Chrysler-Mitsubishi plant in Illinois? . . .

"We are moving much more toward a global economy."

(Excerpted from *The San Diego Union*, May 20, 1990.)

WRITE your ideas about the potential problems of global joint business ventures. Keep them in your notebook. WRITE one good question concerning the future of international business based on the information you got from this article and from other articles on the topic.

Your opinion! In a shrinking world, which countries can live without cooperation and exchange with other countries? LIST some advantages of multi-national business. What about disadvantages?

Look through magazines, newspaper and other sources for information regarding travel safety, environmental concerns, and global interrelationships. Consider and include airplanes, tourist and cargo ships, personal autos, highways, improved communication, and/or better information about other parts of the world. DESCRIBE/REPORT the information you find.

Transportation and Global Mobility
Study Activities

PHASE I: Reaction to the Articles Relating to Transportation

Use the form on page 114 of the Reference Section. Your teacher will either provide copies of page 114 or ask you to copy it. Place your written reactions in your notebook.

1. Does the emphasis on transportation for the future, as you understand it from the news items, seem to focus on quality or speed, cargo or passenger capacity, or cargo or comfort?
2. What are your ideas about vehicles that will respond to the driver's voice?
3. One of the news items related death tolls with higher speed limits. What are your ideas about speed on the nation's highways?
4. Why do many people believe that airplanes are safer modes of transportation than automobiles?
5. What other articles have you seen about transportation in the future?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the form on page 115 in your Reference Section. Your teacher will either provide copies of page 115 or ask you to copy it.

1. What can you forecast concerning pilots for trains, airplanes, and space vehicles of the future? Will ocean liners of the future need pilots?
2. What will happen to personal, family transportation in a future when gasoline becomes scarce and unavailable?
3. What do you think of when you see the term GLOBAL MOBILITY?

PHASE II-B: Alternative Futures for Transportation

Use the form on page 116 in your Reference Section. Your teacher will either provide copies of page 116 or ask you to copy it.

1. Your future society has something new: YOUR ideas about moving people and materials. How will your ideas overcome famine and shortages in far reaches of the world?
2. What will be some of the superior features of transportation systems of the future? Some of the inferior features?
3. Will people travel more often or less often? Will they travel greater distances or stay closer to home? Why?
4. What changes might be made in the world due to a future network of efficient and effective transportation systems?
5. What effect would the bullet train have on transportation in your state and in other states?

PHASE III-A: Individual and Group Research

Use the form on page 117 in your Reference Section. Your teacher will either provide copies or ask you to copy it.

Refer to the introductory questions at the beginning of this unit. These questions can be a starting point for your area of research. Restate some of the questions if they will provide Focus Questions for your investigation. These are written reports, but, in addition, some of you will be selected to present oral reports as well. Six of you may be excused from this activity if you are members of the two debate teams.

TITLE OF REPORT: _____

DATE OF REPORT: _____

PHASE III-B: Debate

Choose teams of either two or three students to represent the AFFIRMATIVE and NEGATIVE positions. Here are some suggested debate topics:

1. RESOLVED: An International, or United Nations, Trade Agency should be established immediately to monitor all trade and transportation between nations, thereby expediting the movement of goods and materials to areas of critical need.
2. RESOLVED: Development of alternate fuels, rather than petroleum-based fuels, should have the highest priority for both government and private-research funds.
3. RESOLVED: All people should have the right to be moved rapidly on this globe—not just those who can afford it.

DEBATE SCHEDULE AND TEAMS

RESOLVED: _____

_____

_____

DATE OF DEBATE: _____

Debate Team #1	**Debate Team #2**
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

PHASE III-C: Individual or Small Group Action Research

Use the Suggestions for Research and Report Topics found on pages 41 and 42 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations.

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 118 of the Research Section. Your teacher will either provide copies or ask you to copy it.

Select one of the following and write your response. Place it in your notebook.

1. After examining your notes, what do you think would be the best high-speed transportation system for the future?
2. What types of materials should have the first priority for high-speed global shipments?
3. What changes have occurred in your thinking about global transportation since you started this unit?

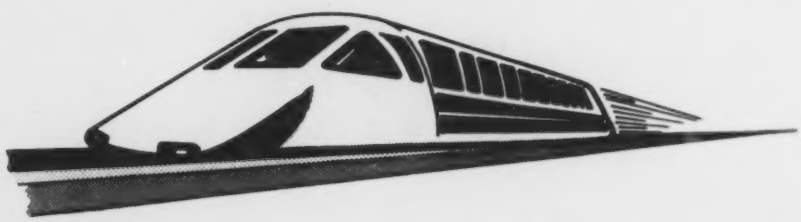
PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 119 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

Select one or more of the following problems. Follow the procedures as given by your teacher to think of new creative solutions and to develop criteria. Choose the most appropriate solutions.

1. In what ways might the United States improve the condition of the railroads in this country?
2. In what ways might we improve the concept of "people movers"?
3. What might be the single best improvement that could be made on the present-day automobile to increase its efficiency and lower its costs?

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.



REVIEWING YOUR FUTURE OPTIONS
Population, Energy, Space, and Transportation

You are the futurist! **Your ideas** about your future are important!

1. What do you consider the most likely source of energy for your world thirty-five years from now?

   _____

   Why? _____

   _____

2. Describe the options for vehicle fuels that will be available to you fifteen years from now.

   _____

   _____

   _____

3. What is the earliest year that people will live in space colonies? _____
   List four reasons why people would want to live in space cities.

   _____

   _____

   _____

   _____

4. How will life extension and longer life spans for others affect your future life at the start of the 21st century?

   _____

   _____

   _____

   _____

5. From your home newspaper, select two items dealing with future concerns about population increases, energy needs, space exploration, or transportation. On a separate paper summarize the two articles and compose three questions about them for use in discussion groups. File them in your journal for reference.

FUTURE TIME

STUDY the "Five Basic Periods of the Future" chart on the first page of the Graphs, Charts, and Tables portion of the Reference Section. WRITE your ideas about identifying future times. In which of your future times will these occur?

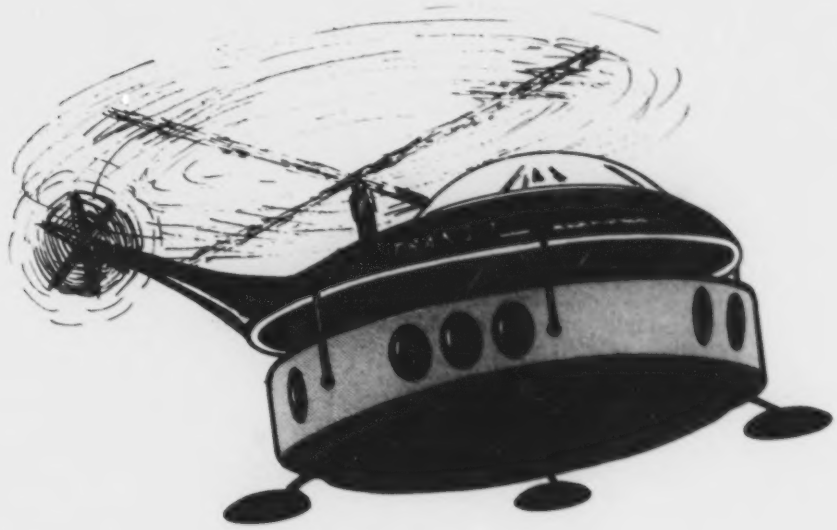
_____ "This is your captain speaking. I am in my office in Topeka. My instruments show Flight #162 on schedule between Phoenix and Kansas City. You will be landing at Kansas City in 44 minutes. Happy flying!"

_____ There are separate lanes for many different kinds of driving. For example, there are fast and slow automobile lanes, bus lanes, truck lanes, and bicycle lanes.

_____ Your automobile talks to you to warn you of dangers ahead, gas shortages, air pressure changes, etc.

_____ Pre-programmed autos drive safely for you according to computer chips with built-in predetermined routes.

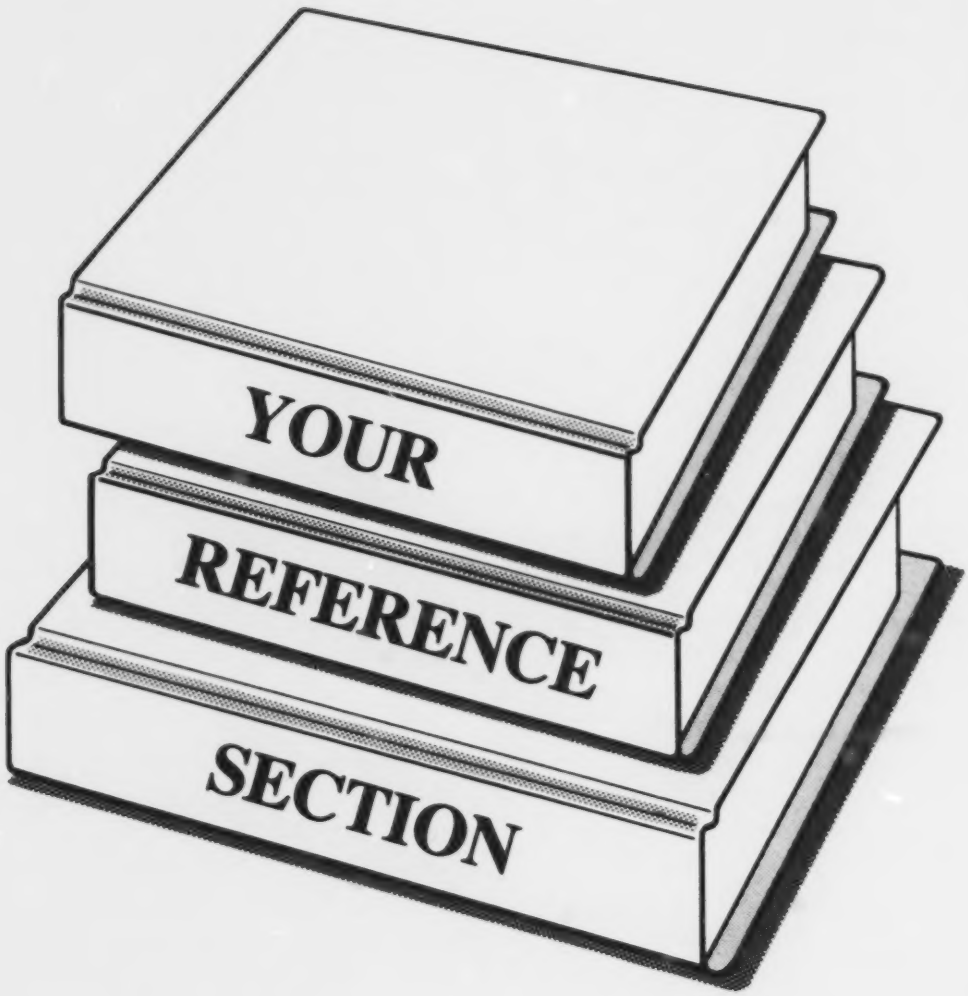
_____ Helicopter buses take you from the outlying suburbs to mid-town, rooftop helicopter ports.



An idea to consider:

Minds are like parachutes. They have to be open to work properly, especially if they are to respond to the challenges ahead.

Who is inventing the future? YOU ARE!



Mini-Biographies
What Some Futurists Have Said
Graphs, Charts, and Tables
Forms
Evaluation Grid
Glossary
Thinking-Skill, or Process, Verbs

Mini-Biographies:
Twenty-First Century Men and Women In the Twentieth Century:

This section introduces you to a few accomplished people who have expressed concerns and ideas related to living in the changing future. You have read about many people with similar concerns in every issue of your daily newspaper. They include people from all professions and all nationalities. Medical researchers, astronauts, scientists, politicians, teachers, writers, and communicators represent only a small part of the complete list.

ARTHUR C. CLARKE

Born in England, 1901. Now lives in Sri Lanka (Ceylon)

Science Non-Fiction and Fiction Author, Underwater Photographer, Editor, Scientist, Former Chairman of the British Planetary Society, Fellow of the Royal Astronomical Society, Winner of the Kalinga Prize from UNESCO, Lecturer, and Teacher

In 1945 Clarke projected the use of satellites in orbit around the earth as a basis for global communication. It occurred about thirty years later. He also projected the landing of space rockets on the moon twelve years before it actually happened.

Arthur C. Clarke is best known as the author of a short story that became the movie *2001: A Space Odyssey*. His most recent story, *2010: Odyssey Two*, tells of the return of a team of astronauts to the locale of the movie *2001*.

Clarke has shown that one antenna in a remote village any place on earth is all that is needed for improvement of education, health, hygiene, and agricultural techniques in that part of the world. He has expressed concerns that Third World countries will leapfrog a whole era of communications technology and move straight into the Space Age.

The following are some books written by Arthur C. Clarke:

Profiles of the Future
The Promise of Space
Prelude to Space
Childhood's End

Other information about Arthur C. Clarke can be found in library resources. Look up ARTHUR C. CLARKE in the card catalog of your library.

BERTRAND DE JOUVENAL

Born in France, 1901

Political Economist, Philosopher, Journalist, Diplomat, Author, and Lecturer

Bertrand de Jouvenal inherited the title "Baron" from his father but preferred not to use it. He learned about politics, government planning, and intrigue while working with his father, a respected French diplomat.

De Jouvenal's experiences gave him insights that led to his comment that politicians do not usually consider long-range consequences of their political actions. He was one of a group of men who felt that the political decisions after World War I would lead to another war.

De Jouvenal coined the term "futuribles," meaning possible futures. He founded an international organization by that name with many leaders and scholars who were involved in research of the future, particularly in government.

Bertrand de Jouvenal was a guest speaker at the First Global Conference on the Future in Toronto in 1980. At that time he was honored for his life-long dedication and work regarding concepts of future study and research.

The following are some books written by de Jouvenal:

The Directed Economy (about government planning and control of economics)

The Art of Conjecture (about futures thinking so that decisions will not adversely affect the future)

Other materials regarding BERTRAND DE JOUVENAL can be found in library sources. *The Study of the Future* by Edward Cornish and *The Futurists* edited by Alvin Toffler are two sources for studying de Jouvenal and other futurists. Both these books are in your list of books for Future Reading.

R. BUCKMINSTER FULLER

Born in Massachusetts, 1895—Died 1983

Designer, Engineer, Architect, Author, Poet, and Professor

Buckminster Fuller was the designer of many geodesic domes including the twenty-story geodesic sphere for the United States Pavilion at the 1967 World's Fair in Montreal. He believes that these structures could be built to house any number of people (up to a million) in a controlled, protected atmosphere and community. The same kind of design might be the most feasible for use on the moon's surface if colonies are established there.

Fuller was convinced that construction materials could be used more efficiently and effectively. He believed that some substitutions of materials could enhance the structures. He called that process "ephemeralizing," a process of doing more but using less.

He was also a leading designer of floating cities, communities in which people live, work, attend school, and intermingle with any number of other people. In his concept, a floating city could be built and moved to wherever it was wanted. It could be temporarily located or permanently anchored. Many floating cities are in planning stages now.

Buckminster Fuller designed a three-wheel auto and developed a new method of map making before satellites began making maps with space photos. Fuller lectured at many colleges and universities. He was known for his concern about the relationship of human beings to their environment.

The following are some books written by R. Buckminster Fuller:

Operating Manual for Spaceship Earth
Nine Chains to the Moon
No More Second-Hand God

Look up BUCKMINSTER FULLER in the card catalog of your school or nearest public library.

HERMAN KAHN

Born in New Jersey, 1922—Died 1983

Scientist, Physicist, Researcher, Lecturer, and Author.

After service in World War II, Kahn became a project analyst for the RAND project, an experimental research group set up by Douglas Aircraft and the U.S. Air Force. Within two years he was senior staff physicist with responsibility to study relationships between military tactics and weapons.

Based on that experience, he wrote a book describing new concerns about possible nuclear war. The book, *On Nuclear War*, helped decision makers in many countries think more cooperatively about responses to nuclear threats.

In 1961, Kahn established the Hudson Institute, which is now involved in public-interest research. Kahn was a critic of the intellectual and educational community, which he considered counter-productive in preparing people for life in their futures. He also believed that many worthwhile changes are coming out of the new technologies. Kahn is often referred to as the "Unthinkable Optimist."

The following books were written by Herman Kahn:

On Nuclear War
Things to Come
The Next 200 Years

The public library might be the best place to look for materials by and about Herman Kahn. Look up resources under his name and also under "Hudson Institute."

JOHN McHALE

Born in Scotland, 1928—Died 1978

Sociologist, Designer, Administrator, Lecturer, Author, and Planetary Planner

John McHale believed in global interdependence. He stated, "There are no local problems anymore. We have reached the point in human affairs at which the basic ecological requirements for sustaining the world community must take precedence."

McHale's vision for the future included the belief that modern man still has the opportunity and capacity to choose his future, both collectively and individually. He felt that the future will be what people determine it to be. He was a scientist open to new ideas about technological advances. He believed that future cities might want or tend to specialize; in other words, he believed there might be recreation cities, farm cities, scientific cities, educational and museum cities, and cities that focus on certain kinds of work or product.

McHale worked with Buckminster Fuller on the World Resources Inventory. He became director of the Center for Integrative Studies in New York and later moved the Center to the University of Houston. McHale was a planetary planner. He created understandable graphs and charts in his book, *World Facts and Figures*, from complicated scientific and economic data.

He believed that the main determiners of the future would not be science and technology, but rather values, concepts and social arrangements. He saw the greatest need as one of devising agencies capable of helping people escape the artificial dilemmas into which mankind has fallen.

McHale died in 1978, a few days after he was a featured speaker at a national conference on the future of education.

The following books were written by McHale:

World Facts and Figures

The Future of the Future

Look for these books by McHALE in the card catalog at your school or nearest public library.

MARGARET MEAD

Born in Philadelphia, 1901—Died 1978

Anthropologist, Curator, Author, Newspaper Columnist, Explorer, Lecturer, and Teacher

Margaret Mead was a former curator of the American Museum of Natural History, a past president of the American Anthropological Association, and a past president of the American Association for the Advancement of Science. These are but a few of her many honors.

She began her anthropology career at age twenty-three, studying primitive culture in Samoa. Later she did more research in other Pacific islands. Her experiences led her to believe that people ought to move the future into the present in their thinking. She thought that the young should learn from the old and that the old should learn from the young. She felt that educational systems in the world were not adequately preparing students for life in the changing future.

Margaret Mead was also concerned about the abilities of people to adapt to continual, rapid change. She stated, "No one will live in the world in which he was born, and no one will die in the world in which he worked in his maturity."

The following are some books written by Mead:

Coming of Age in Samoa

Growing Up in New Guinea

New Lives for Old

Other information about Margaret Mead can be found in encyclopedias, in biographies, and in introductions or author information sections of books she has written. Look up MARGARET MEAD in the card catalog in your library.

ALVIN TOFFLER

Born in New York, 1928

Author, Editor, Social Critic, Professor, Lecturer, and Newspaper Correspondent (Also Auto-Assembly-Line Worker, Millwright, Trucker, and Punch-Press Operator)

Alvin Toffler originated the term "future shock," by which he identifies the disorientation that takes place in society and people when change happens too fast and too often. In his book by that name, he talks about creating a new society rather than changing the old. He expresses his concerns that people are not learning about their futures. His book gives society many reasons to plan ahead. He believes that schools and educational systems do not look ahead to the time when their students will be adults, but rather, they look backwards to past times and experiences as the guide to new situations.

Toffler's experiences after *Future Shock* led him to write *The Third Wave*. This book refers to the third great societal wave of life based on renewable sources and on new methods of production. Toffler says that the new wave will result in new social systems which will be radically different from the past. (The "first wave" overlapped the agricultural era of thousands of years. The "second wave" was essentially the two to three hundred years of the industrial age.)

Toffler taught the first Sociology of the Future class at the New School for Social Research in New York City and conducted research into future-values systems at Cornell University. He has been a Visiting Scholar for the Russell Sage Foundation, giving lectures at many campuses in the United States. He teaches that a new society is being created, that mankind is experiencing and dealing with many revolutions at one time.

The following are some books written by Toffler:

Future Shock

The Third Wave

Learning for Tomorrow, Editor

The Futurists, Editor

Other materials by and information about Alvin Toffler can be found in library sources. Use the card catalog in the school or the nearest public library to find more information about ALVIN TOFFLER. Some of his books and those about him have biographical sketches in the front or the back.

What Some Futurists Have Said!
And Project Ideas Based on Their Comments

RESPONSIBILITY FOR THE FUTURE

Mead, Margaret. "Dangers and Hopes for Humanity." *U.S.A. Today*, People and Perspectives, 107: 1-2. October 1978.

According to Mead, humankind is facing an unprecedented, awesome responsibility that requires many modifications of behavior. She stated, "Never before has one generation been responsible for the survival of an entire race of man."

PROJECT IDEA:

What did Margaret Mead mean when she talked about the responsibility of a generation? What will you be able to do in your lifetime for humankind's "survival"?

PREPARING TO LIVE IN THE FUTURE

Toffler, Alvin. *Future Shock*. New York: Bantam Books, 1970.

Toffler coined the term "future shock." It refers to humankind's need to continually adapt to new situations created by the acceleration of man-made inventions, perhaps the most urgent problem for people today. He wrote that future shock is a real sickness, a psycho-biological condition affecting many people, because they have never needed to make so many changes. He also said that education today is not looking to the future for its models or examples, but seems to be increasing the potential for future shock by preparing people for the twentieth century rather than the twenty-first.

PROJECT IDEA:

To what extent can you agree with Toffler regarding people's ability to adjust and adapt on a continuing basis? Describe your ideas about the present-day curricula in schools in regards to the adaptability and flexibility of people.

INFLUENCING THE FUTURE

Leonard, George. "How Will We Change?" *Intellectual Digest,* 4:15-17. June 1974.

Human beings still have alternate choices and a potential for influencing the future. Leonard stated that constructive change must be accomplished now and he suggested four innovative ideas: 1) new perceptions of living and lifestyle are needed; 2) all people should be involved in positive programs affecting all aspects of living; 3) new ideas regarding conservation should be developed; and 4) specific models should be created from specific planned objectives for humankind.

PROJECT IDEA:

What do you think Leonard meant when he used the word "still" in the statement about human beings still having choices and potential? Was he suggesting a future where human beings will not have those options? If so, how much longer will we retain those choices? What factors in the future world will remove those choices?

EDUCATION

Holt, John. "Why We Need New Schooling." *Look Magazine,* 34:52. January 13, 1970.

Holt said that it is education's responsibility to prepare students for a future, ever-changing world where they will become decision makers as adults. Holt also observed that in order to answer the question "What makes a good education?" it is necessary to ask, "What makes a good life?"

PROJECT IDEA:

Why did Holt try to relate education to real life? If you were given the task of developing a "Curriculum For Life" program, what activities and learning experiences would you include?

Markley, O.W. "Why Study the Future?" *Thrust,* 3:5,7-10. May 1974.

Markley observed: "Educators need to anticipate the future." He insisted that schools teach students about possible future realities so that society can prepare for a different tomorrow. He felt that society should be flexible and should change institutions and values as needed.

PROJECT IDEA:

What would you add to a curriculum that should help students to be better prepared for life as adults? Would Markley agree with you or not? Why?

SPACE COLONIES

O'Neill, Gerard K. "Space Colonies: The High Frontier." *The Futurist*, 10:25-33. February 1976.

O'Neill wrote that space colonies are more practical than a moon settlement. A space colony could be made self-sufficient and capable of supporting 10,000 people, 4,000 of whom would be building other space colonies and stations. O'Neill stated that the moon can be mined for metals and minerals which can be used to build space colonies. He also stated that there is a possibility that by 2150 there might be more people on space colonies than back home on Earth.

PROJECT IDEA:

Write a letter to your teacher from your new home in a space colony. Describe your everyday life and include the following: watching ball games, raising your own vegetables, going to the store, and going to the movies. Tell about the gravity and the oxygen supply. Invite your teacher to come and live in the space colony.

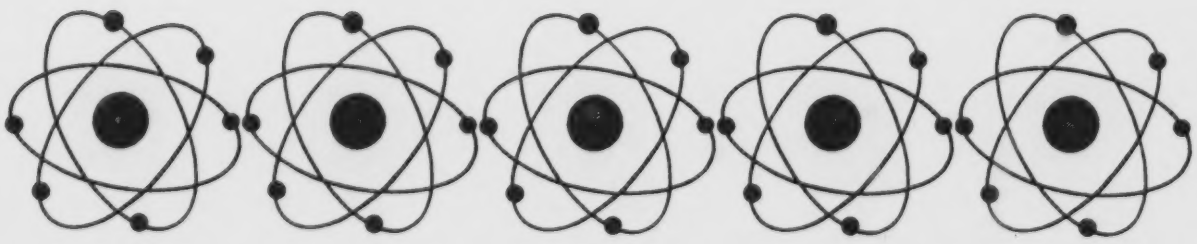
ENERGY

Hammond, Allen L., et al. *Energy and the Future.* Washington, D.C.: American Association for the Advancement of Science, 1973.

New sources of power and energy will be needed to maintain acceptable standards of living in the future. Hammond's concerns included the possibility that we will no longer have petroleum-based energy, and he regarded coal as the fossil fuel of the future. He considered fission and fusion as important sources for generating electricity, supplemented by geo-thermal power, solar energy, and fuel from waste products.

PROJECT IDEA:

If you could plan energy policy for a future world, what sources of fuel and energy would you develop for use in the 21st century?



Graphs, Charts, and Tables

These tables were adapted from materials written by Earl C. Joseph and by Don Glines.

Joseph said that the immediate future cannot be controlled from present time—that today's major decisions will have most effect on the middle-range future, five to ten years from now. WHAT are your ideas about making decisions for a time several years away?

Glines saw an historical continuum with both the past and the future. WHY might you, as a futurist-researcher, be interested in the past in your study of the future?

DEVELOP your own future time table. COPY the headings below and extend the columns as far down your paper as is necessary.

TITLE the time periods in the first column. Use names such as "Now," "Near-term Future," etc.

FIVE BASIC PERIODS OF THE FUTURE

Future Time Periods	*# of Years from Present*
Now (the immediate future)	Up to 1 year
Near-term future	1 to 5 years
Middle-range future	5 to 20 years
Long-range future	20 to 50 years
Far future	50 years or more

Adapted from Joseph, Earl C., "What Is Future Time?" *The Futurist*, August 1974.

FUTURES RESEARCH:
An Analysis of a 200-Year Period

Projections & Perspectives	*Time Periods*
Future forecasting	100 years hence
Long-range forecasting	50 years hence
Intermediate-range possibilities	25 years hence
Near term	Today plus 10 years
Near past	Today minus 10 years
Historical perspectives	View of the past 100 years

Adapted from Glines, Don. *Educational Futures I: Imagining and Inventing*, page ii. Millville, Minnesota: Anvil Press, 1979.

In the second column, DESCRIBE the lengths of your time periods, i.e., "Years from Now" or "From _____ to _____" dates.

The third column introduces a new element not found in the tables above. It is for your projections of future inventions, happenings, and events, either personal or universal. These could include your first trip to a moon colony or the first Space Peace Conference. Be consistent. Do not visit a space colony in 2015 if your space colony isn't established until 2024.

_____'S FUTURE TIME TABLE
(Your Name)

Basic Time Period	*Time Period In Years*	*Momentous Future Events*

POPULATION AND OLDER POPULATION IN THE UNITED STATES, 1965-2025

Year	*Total Population: All Ages*	*% Aged 65 And Over*	*% Aged 75 And Over*	*% Aged 80 And Over*
1965	194,303,000	9.5%	3.4%	1.6%
1985	238,631,000	12.0%	4.9%	2.6%
2005	275,394,000	13.1%	6.7%	4.1%
2025	301,394,000 (low)	19.5%	8.5%	4.8%
	312,700,000 (high)	19.5%	8.5%	4.8%

		*% Aged 60 to 79**	*% Over 80**
2050	299,800,000	21.1%	19.2%
2080	292,200,000	21.3%	9.1%

Source: "An Aging World," *International Population Report*, Series P-95, No. 78, U.S. Department of Commerce, Bureau of the Census, 1987; *Information Please Almanac*, 43rd edition. Boston: Houghton Mifflin Co., 1990.

Notes: *The figures for 2050 and 2080 are from different sources than the figures above. In these figures, total population is projected to decrease slightly by the end of the 21st century. This might be based on environmental or other circumstances, or it might be hopeful thinking.

In 2010, the post-World-War-II babies will be reaching their sixties.

The year 2025 estimates include both high and low estimates with the percentages remaining the same for all ages.

Why might the chart at the bottom right corner make you feel more secure about being born after 1966? LIST seven reasons for the decrease in the percentage of deaths between 1915 and 1966.

LIFE EXPECTANCY CHART: MEN AND WOMEN Selected Areas/Times

Year (A.D.)	*Area*	*Life Expectancy in Years*		
		Total. Pop.	*Men*	*Women*
1600	World	29.0		
	Europe	31.0		
1750	Early America	34.1		
1900	United States	47.3		
1931	Canada		60.0	62.1
1965	Canada		68.4	74.2
	United States	70.1		
1974	World	59.0		
	N. America/Europe	71.0		
	Latin America	62.0		
	Asia/Africa	56.0		
1978	United States	71.2		
1985	United States	74.6	74.1	82.1
	Japan		77.1	82.6
	Sweden		76.6	82.8
	England		74.1	80.5
	Mexico		66.4	71.0
1990	United States	76.3		
2000	United States	79.9	76.5	85.6

Sources: "Man's Population Predicament," *Population Bulletin*, Population Reference Bureau, April 1971; McHale, John. *World Facts and Figures*. New York: Macmillan, 1972; "An Aging World," *International Population Report*, Series P-95, No. 78, U.S. Department of Commerce, Bureau of the Census, 1987.

PERCENTAGES OF THE WORLD'S ELDERLY (OVER 65) POPULATION

Nations	*1990*	*2000*
Developed	46%	41%
Developing	54%	59%

Source: "An Aging World," *International Population Report*, Series P-95, No. 78, U.S. Department of Commerce, Bureau of the Census, 1987; *Information Please Almanac*, 43rd edition. Boston: Houghton Mifflin Co., 1990.

Note: The world's elderly population currently is growing at a rate of 2.4% per year, faster than the global population as a whole. Also, the elderly population in developing countries is growing at a faster pace than in the developed ones.

DEATHS BEFORE AGE ONE: U.S.A 1915, 1966 and 1987

Year	*Deaths of Children Under Age One*
1915	999 deaths per 100,000 births
1966	161 deaths per 100,000 births
1987	131 deaths per 100,000 births

Source: "Length of Life, Man" *The World Book Encyclopedia*, 1967 ed., Volume 12; *The World Almanac and Book of Facts*. New York: Scripps-Howard, 1990.

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POPULATION GROWTH IN THE WORLD					
Year	*Estimated Population (In Millions)*	*Historical Reference*	*Year*	*Estimated Population (In Millions)*	*Historical Reference*
7500 B.C.	Under 5	Start of recorded history	1930	2,000	100 years to reach second billion
500 B.C.	200	Greco-Persian Wars	1945	2,432	United Nations founded
A.D. 1	250	Birth of Christ	1960	3,000	30 years to reach third billion
1600	500	America is colonized	1969	3,598	Apollo 11 puts first human on moon
1776	750	American War for Independence	1976	4,000	16 years to reach fourth billion
1803	901	Louisiana Purchase	1986	5,000	Fifth billion
1830	1,000	Over 2 mil. yrs. to reach 1st billion population	1995-9	6,000	Estimated sixth billion
1861	1,180	American Civil War	2014-9	8,000	How many years from now?
1898	1,598	Spanish-American War			

Sources: "Man's Population Predicament," *Population Bulletin.* Population Reference Bureau, April 1971 ; McHale, John. *World Facts and Figures.* New York: Macmillan, 1972.

Use the years and the corresponding estimated population figures to MAKE your own population graph. Place the years on the base/time line and the population figures on the growth line. Refer to the Projections and Forecasts Section of this book for directions on preparing a graph.

HOW POPULATIONS INCREASE

More births than deaths per 100,000 people
Longer average life spans
Improvements in health care and medicine that lower the infant mortality rate
Peace-table settlements rather than wars
Immigration from other areas/countries
Fewer accidents through safety habits.
Do you have others? Add them to the list.

_____

_____

_____

Incomplete List of Building Materials for Houses

(Compiled from Student Responses to Previous Assignments)

adobe (clay) natural caves sod and dirt
steel (metal) plastic rocks cement
wood (logs) trees bricks styrofoam glass

Do you have others? List them here. _____

_____

Energy secretary says needs of environment, economy must be met

By David Graham
Staff Writer

The nation's future energy policy must strike a balance between developing the economy and protecting the environment, Secretary of Energy James Watkins said here yesterday.

But that policy will have to rely on a range of energy sources from nuclear to fossil and renewable sources, including solar and wind power, Watkins said in the keynote address of an energy symposium at the San Diego Convention Center.

The department's approach to developing a national energy policy is different from previous attempts because it seeks "integration of environmental and economic policy with energy policy," Watkins said.

"We're serious about energy and the environment."

But Watkins told the audience at the Responsive Energy Technologies Symposium & International Exhibition, "We will need contributions from all of our supply options."

The energy secretary said the plan he is to give President Bush by December will emphasize energy conservation and energy efficiency measures.

Watkins described some steps he said the department has already taken to increase energy efficiency in the United States and to look for new energy sources.

He called the Department of Energy "a test bed" for new technologies that can reduce energy consumption in federal buildings by 6 to 10 percent. By 1993, new technologies and efficiency requirements will reduce by 25 to 30 percent the energy consumption of refrigerators and other appliances, he said.

The department also is encouraging other energy sources, including wind and solar power, in regions of the country where they are appropriate, he said.

And the secretary said that within two weeks he will sign an agreement with the Department of Agriculture to pursue a program to raise crops for ethanol fuel.

Watkins said some hybrid plants the department is studying, such as a particular type of poplar tree, could be important sources of fuel because they grow more bulk than ordinary varieties in the same time. "This is a whole new ballgame for the DOE," Watkins said.

Watkins defended the Bush administration's policies on air pollution and its response to the debate over whether carbon dioxide and other air pollutants are causing the earth to warm and the climate to change.

The administration has been criticized by environmental groups for not acting more swiftly and decisively to limit carbon dioxide and other emissions that some scientists believe linger in the atmosphere and trap the sun's heat and warm the planet.

Watkins said there is a "lack of understanding" of how the pollutants are affecting climate, and he noted that Bush doubled the federal research budget for climate change to $1 billion this year.

And the secretary noted that the president has called for a national tree-planting campaign.

Bush also has supported phaseouts of chlorofluorocarbons, chemicals that destroy the atmosphere's protective ozone layer, by the year 2,000 where substitutes are available, Watkins said. The ozone layer filters out harmful ultraviolet light.

Reprinted with permission from *The San Diego Union*, Friday, June 15, 1990.

ENERGY: WORLD NUCLEAR POWER
Selected Countries

Country	*# Reactors In Operation*	*# Reactors Under Construction*
Belgium	7	0
Canada	18	4
China	0	3
England	40	2
Japan	38	12
United States	106	7
U.S.S.R. (Russia)	56	26
Other countries	164	51
WORLD TOTAL	429	105

Source: International Atomic Energy Agency, 1989.

China is the only developing country listed in the World Nuclear Power chart. (See Glossary for developing country.) The United States has about ¼ of all the nuclear reactors in use today, but it has only 1/15 of the new ones under construction. What does it mean that the other countries are catching the United States in nuclear energy production?

ESTIMATED ALTERNATE RENEWABLE ENERGY SOURCES FOR THE TWENTY-FIRST CENTURY

Each energy unit is the equivalent of the energy produced by one thousand-million metric tons of coal.

New discoveries of energy sources or new uses of present sources may increase this estimate to more than twenty energy units.

Note: This is a form of a bar graph in which comparisons are shown graphically. In this example, sources of anticipated energy for the next century are compared by divisions on a single graph.

Solar radiation energy is obviously expected to be the major source of renewable energy. What are the next two largest sources based on the projections on the graph?

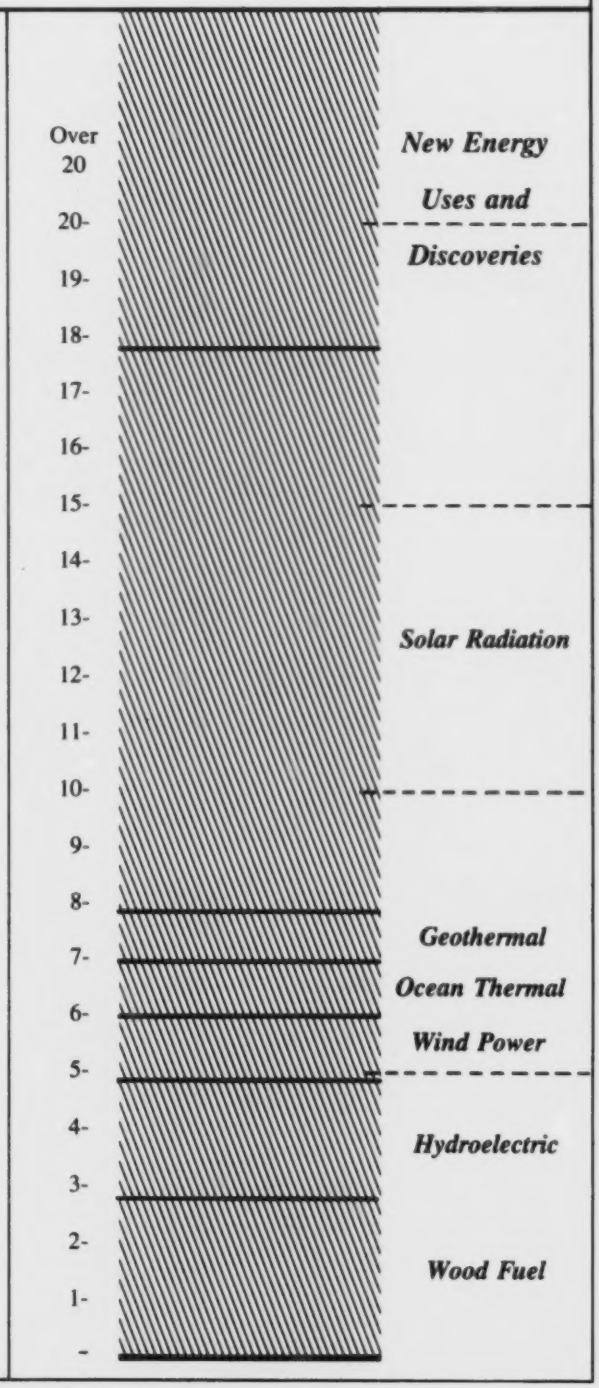
_____

_____

_____

_____

Information used on this graph has been taken from "World Energy Demand," *The Statesman's Yearbook*, 1980-81, 117th edition, John Paxton, editor.



WORLD ENERGY REQUIREMENTS: 1960-2000
Projected From Current Sources of Energy in Use

EACH ENERGY UNIT EQUALS ONE THOUSAND-MILLION METRIC TONS OF COAL

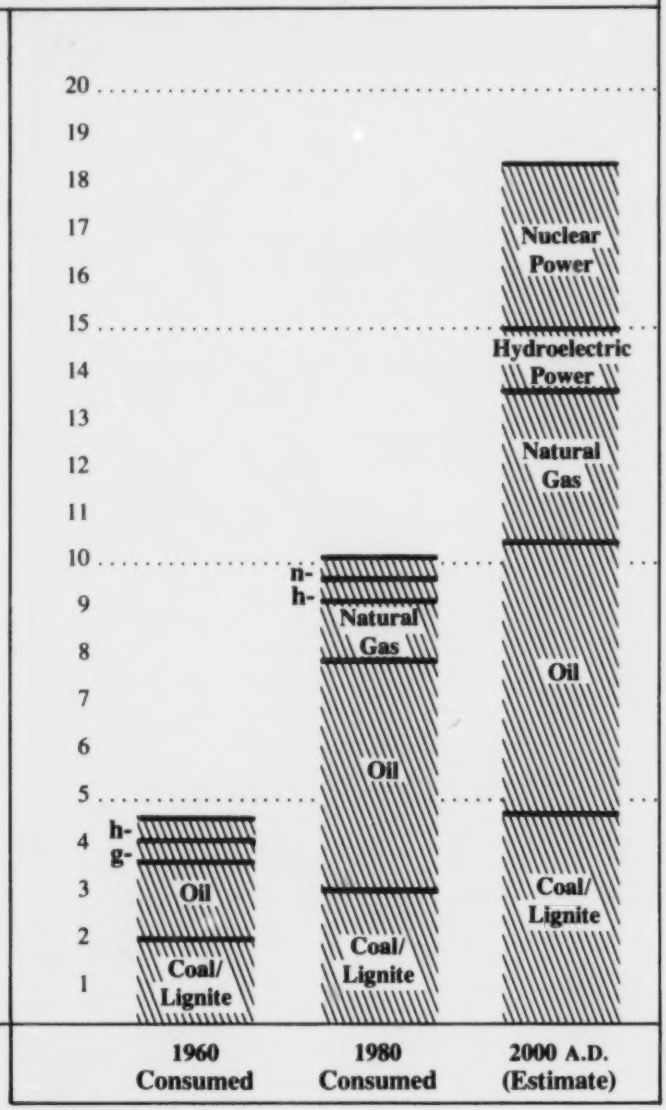
Key to items in the 1960 and 1980 columns:

h – hydroelectric power
n – nuclear power
g – natural gas

Each energy source on the graph shows increases in both 1980 and 2000 A.D.

For other sources of energy to help meet future requirements, refer to the graph on page 94 showing renewable energy sources.

Statistics and estimates used on this graph were taken from "World Energy Demand," *The Statesman's Handbook*, 1980-1981, 117th edition, John Paxton, editor.



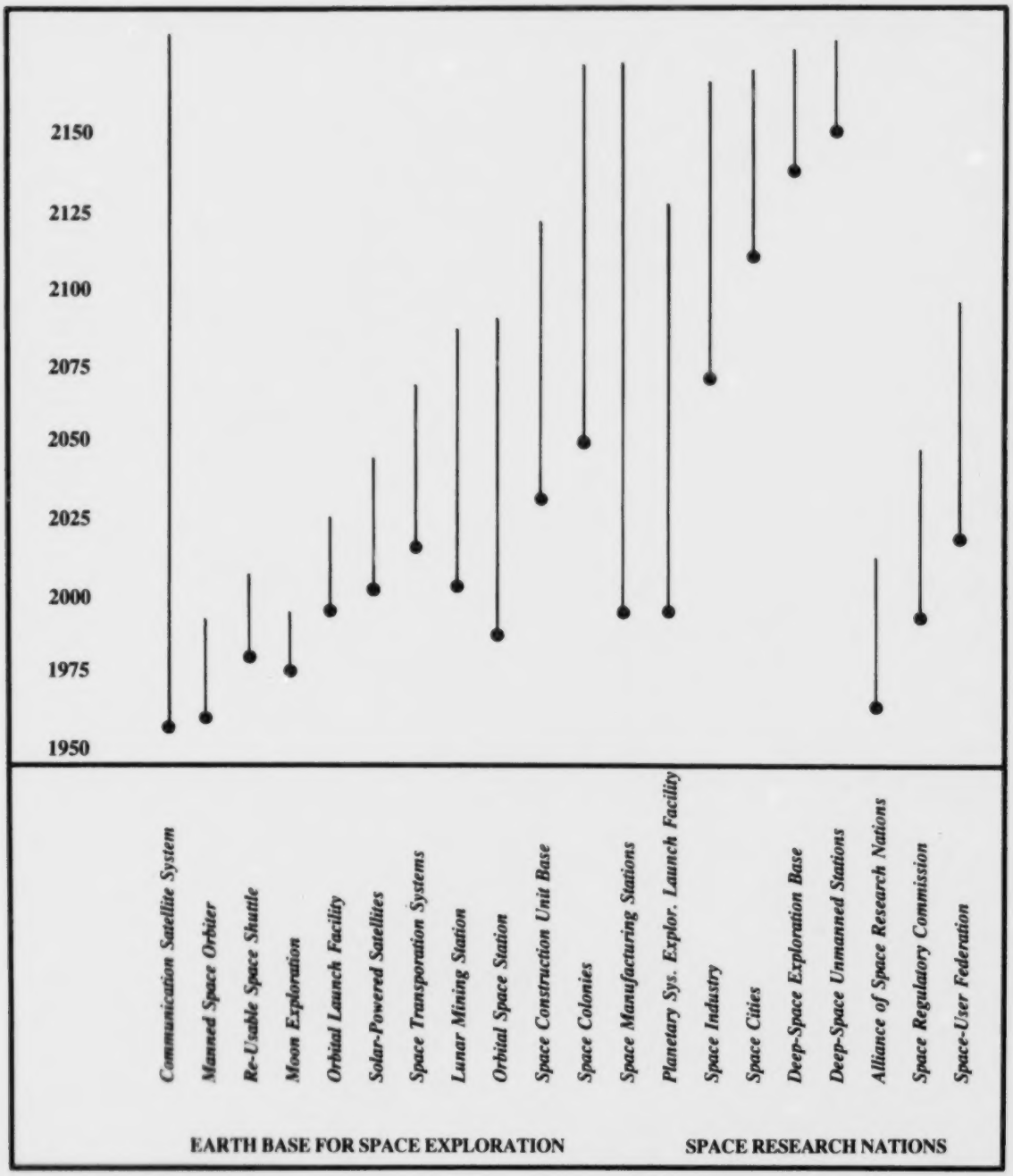
Incomplete List of Energy Sources

(Compiled from Student Responses to Previous Assignments)

alcohol	geothermal	hydroelectric	natural gas		
petroleum	photovoltaic battery	wind	coal	gravity	magnetics
nuclear	physical (body)	storage battery	explosives		
heat (fire)	mental	oil	solar	water	

On another paper, make a heading titled "Sources of Energy." Divide the paper into two columns, one for "Renewable Sources" and the other for "Non-renewable Sources." From the charts on this page and the previous page, list the sources of energy in the appropriate columns. For example, oil belongs in the non-renewable list while wind power is a renewable source. Add to the lists other sources of energy that you know.

MAN'S PROGRESS IN SPACE
PROJECTED INTO THE TWENTY-FIRST CENTURY
1950 to 2150



Special Project Idea: Develop your own space progress chart. Focus on aspects of space travel and industry that are of special interest to you. Describe to your class members the purposes and goals of your ideas.

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SPACE INDUSTRIALIZATION: Long-Range and Short-Range Goals

Time Periods	*Goals*
LONG-RANGE	Expansion and survival of mankind
SHORT-RANGE	A. Space-derived services
	1. Communications enhancement — Mail
	Health care — Security
	Relief — Conferencing
	Information services — Education
	2. Shuttle services
	Transportation
	Space station assembly, repair and maintenance
	B. Space-derived products
	1. Biological products made in space for health services
	2. Goods and materials made better in vacuum and/or no-gravity space environments, such as:
	Computer circuit chips — Crystals
	Optical filters — Optical glass
	Semi-conductors — Radiation detectors
	New compounds
	C. Energy from space
	1. Electrical power from solar radiation, the most likely source to meet future demands for energy
	2. Generation of electrical power in space for use in space and on Earth
	3. Development of technologies for transmission of electrical power to Earth

Adapted from von Puttkamer, Jesco, "The Industrialization of Space: Transcending the Limits to Growth," *The Futurist*, June 1979.

SELECTED U.S. AND INTERNATIONAL SPACE PROJECTS AND MISSIONS, 1989-2005

Year	*Nation(s)*	*Project*
1989	United States	Hubble Space Telescope
	Europe	*Olympus* Communication Satellite
1990	U.S.A.	Roentgen (X-rays) Satellite
1990	Britain, Netherlands, W. Germany, U.S.A.	Gamma Ray Observatory, joint project
1990	U.S.S.R.	Russian Space Shuttle, operational
1991	Europe	*Eureca*, free-flying, retrievable space platform, launched
1991	U.S.A.	Tethered Satellite System
1991	U.S.A.	Atmospheric Lab, Scientific Project
1992	Japan	H-2 Rocket, operational
1993	U.S.A.	Gravity Probe from Space
1994	U.S.A.	X-ray Timing Explorer
1995	Europe and Japan	Europe's *Columbus* and Japan's Space Station modules, launched
1995	Europe	*Ariane*, heavy lift launch vehicle, operational
1997	Europe	Spaceplane, *Hermes*,operational
1998	U.S.A.	*Cassini* rocket (study Saturn)
2000	U.S.A.	Mars *Rover* Sample Return
2004	Britain	Spaceship *HOTOL*, one-stage-to-orbit offers scheduled services to orbit

Add others to the list:

_____

_____

Source: *The World Almanac and Book of Facts*, 1990, page 152.

Project Ideas: Use the charts in this section to help you DESCRIBE five reasons why space exploration should be continued. EXPLAIN what long-range goals of expansion and survival of humankind mean to you. The short-term goals above suggest new industries and products. WRITE your ideas about space-oriented industries.

AUTOMOBILES IN USE: Worldwide and United States, 1950-1987			
Year	*World*	*U.S.*	*U.S. Share*
	In Millions		In Percent
1950	53	40	75
1955	73	52	71
1960	98	62	63
1965	140	75	54
1970	195	89	46
1975	260	107	41
1980	321	122	38
1985	375	132	35
1986	386	135	35
1987		139	

Source: *State of the World*, page 98. Worldwatch Institute.

A lot of cars! How many graphs could you draw using the figures from the above table? The use of autos in the rest of the world increased in 37 years from 25% to 65%. What does that tell you about life and life-style changes in other countries?

U.S. MOTOR VEHICLE FUEL CONSUMPTION 1987 ESTIMATE				
Type of Vehicle	*Total Miles Traveled (millions)*	*Number of Vehicles*	*Fuel Consumed (thousand gallons)*	*Average Miles Per Gallon*
Cars	1,357,191	137,323,637	70,786,979	19.17
Motorcycles	9,855	4,885,772	197,100	50.00
Buses	5,326	602,055	904,244	5.88
Cargo vehicles	551,955	41,118,762	55,859,924	9.88
All motor vehicles	1,924,327	183,930,221	127,748,247	15.06

Source: *Information Please Almanac*, 1990, page 380.

COST OF OWNING A PASSENGER CAR: 1975-1987 Includes gas, oil, tires, maintenance, licenses, registrations, insurances, depreciation and finance charges.					
	1975	*1978*	*1981*	*1984*	*1987*
Cost Per Mile	$18.31	$19.57	$31.92	$31.32	$32.64

Source: *Statistical Abstract of the U.S.*, 109th edition. Washington, D.C.: U.S. Bureau of Census, 1989.

How might the above statistics alter your plans about personal transportation in the 21st century? To what extent would these figures support development of more public transportation?

GETTING READY FOR THE FUTURE

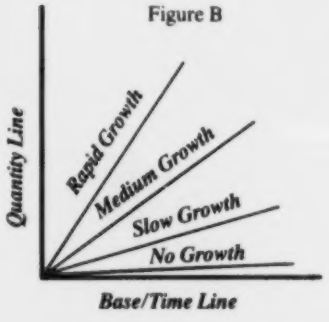
Graphs for Trends, Extrapolations, Forecasts and Projections

A. Figure A shows a sample graph with a Quantity Line and a Base/Time Line. COPY it and USE it with Phase II-B of your study units and with your projects.

B. The graph in Figure B has four added lines representing potential rates of growth: No Growth, Slow Growth, Medium Growth and Rapid Growth. The automobile industry can be used to show examples of each.

In the NO GROWTH line, the quantity of an item does not increase. For example, during World War II, automobile factories manufactured war-related materials and machinery instead of cars. Therefore, the total number of cars-in-use remained the same for each year and a no-growth line would be used.

Figure B



However, as more youth reached driving age, the total number of drivers increased. This increase would be shown on a graph as SLOW GROWTH or MEDIUM GROWTH.

RAPID GROWTH can also be illustrated by the auto industry. When World War II ended, car manufacturers retooled to match the demand for new cars by returning servicemen and servicewomen, teenagers, and other new drivers. The number of cars-in-use for that early post-war period would be represented by a RAPID GROWTH line.

Most trend lines are not straight; most show peaks and valleys above and below an imaginary center (average) line.

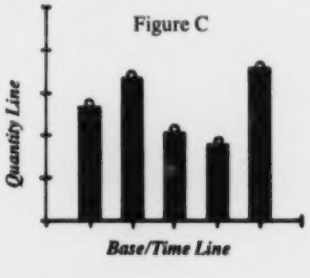
Extrapolation from your graph can help you look ahead. Your line of dots illustrates the patterns of the past. Extension of that line past any current data is a projection into your future. This kind of forecast assumes that the future for your product will be remarkedly similar to the past.

CAUTION: As in all research methods, be sure to consider other factors such as technology, economics, politics, droughts, wars and social change. These and other factors can modify your projections. Shortages of foodstuffs, raw materials and crude oil have affected people in all parts of the globe. THINK ABOUT the ways previous shortages in other parts of the world have affected you and your family.

C. Figure C shows an example of a bar graph. Bar graphs are useful as visual aids for group presentations.

For a bar graph, the QUANTITY Line and the BASE/TIME Line are drawn as for the line graph. But instead of connecting dots on a line, bars are drawn from the base line above each date up to the dot above the date. You might want to use different colors—for example, past dates in one color and future dates in another.

Figure C



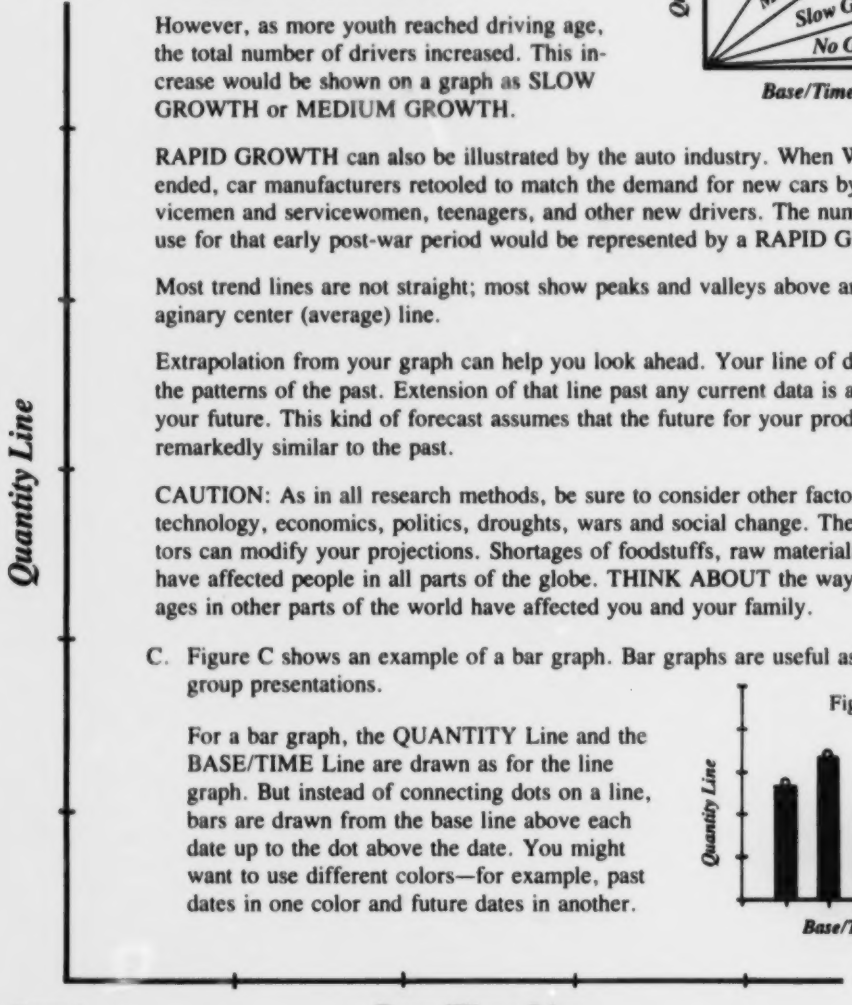


Figure A

GETTING READY FOR THE FUTURE

Phase I: Reaction to the Articles

Name of Unit: _____

What are your reactions (your feelings) after reading the articles relating to this unit?

Do the articles discuss changes that you can accept? That you cannot accept?

Have you seen similar trends in other newspaper or magazine articles?

Write the first ideas that come to mind. The class can use these ideas as a starting point for discussions.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

GETTING READY FOR THE FUTURE

Phase II-A: Forecasts

Name of Unit: _____

What forecasts would you make about the future based on the articles you read and your reactions to those articles?

For example, if you read that oil reserves would be virtually exhausted in fifty years, what would you forecast about the future of personal automobiles?

Use the articles in this book, your reactions to these articles, and other articles as resources. Make two forecasts: one for twenty-five years from now and one for fifty years from now.

GETTING READY FOR THE FUTURE

Phase II-B: Alternative Futures
Twenty-Five and Fifty Years Hence

Name of Unit: _____

Use the forecasts that you developed in Phase I and construct a future that must absorb the impact of your forecast. Describe the results.

For example, fossil fuel (oil) reserves are dwindling, and you have forecast the demise of the personal automobile. What will happen (twenty-five and fifty years hence) to recreation patterns? To work patterns? To other aspects of this future's social and technological fabric?

After you describe the impact of your forecast, make a value judgment. Will this future be a better world than today's? Or will it be worse?

GETTING READY FOR THE FUTURE

Research/Report Outline

I. TOPIC: _____

II. FOCUS QUESTION(S)

a. _____

b. _____

III. PLANNED RESOURCES

a. Books: _____

b. Magazines: _____

c. Newspapers: _____

d. People: _____

e. Agencies: _____

f. Films: _____

g. Other: _____

IV. ORGANIZATION

a. Introductory statement: _____

_____

b. Summary of report: _____

_____

_____

c. Concluding statement: _____

_____

V. NEW WORDS I HAVE LEARNED

a. _____

b. _____

c. _____

Note: This will be the top page of your report.

GETTING READY FOR THE FUTURE

Phase IV: Personal Assessment

Place your answers to Phase IV: Personal Assessment on this sheet. Remember to bring ideas from your notebooks, from discussions with your family and classmates, and from your own activities to this page. Your personal involvement is important.

EVALUATION GRID

The Problem: _____

_____

_____

_____

Directions:

1. List your ten most appropriate solutions that fit the problem statement.
2. Brainstorm all the possible criteria that will help you evaluate your problem solutions.
3. Select one appropriate criterion from each of the "general criteria classifications" to put under A, B, C, D, and E.
4. Rate all alternative solutions against one criterion at a time. (The alternative that fits a criterion best rates a 10; the one that fits it least rates a 1.)

Total each alternative solution's points horizontally and place below.

ALTERNATIVE SOLUTIONS	*Criterion A*	*Criterion B*	*Criterion C*	*Criterion D*	*Criterion E*	TOTALS
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Adapted from the work of Dr. Sidney J. Parnes and Dr. E. Paul Torrance.

Glossary

ALTERNATIVE FUTURES—Term that implies possible future developments that are not predetermined or fixed. Many events could occur that would make a difference in the way that people might look at the future. In exploring various possibilities, people can seek those they consider most needed or desirable.

ANTICIPITORY DEMOCRACY—Community or voter decision making that is based upon choices that are understood and that proceed from many alternatives. It attempts to identify and anticipate possible future needs and problems before they occur.

APARTHEID—Enforced separateness; governmental policy of separation of racial groups and discrimination against non-whites, as practiced in the Republic of South Africa; racial segregation.

ASTEROID—Any of a number of small planet-like objects with orbits between Mars and Jupiter.

ASTRONAUTS—Travelers in space.

AUTOMATIC PILOT—An instrument that automatically keeps an airplane or other flying object on a predetermined course.

BIRTH RATE—The number of births per year per thousand people in a given community, area or country.

BULLET TRAIN—High speed trains that use the median strips of highways for their track system, such as those used in Japan. This rapid transit system is being studied for use in the United States. See MONORAIL.

CHLOROFLUOROCARBONS (CFC'S)—Compounds found in liquids used as refrigerants and aerosol propellants and in foam plastics and some solvents. These chemicals destroy the atmosphere's protective ozone layer. (Examples: air-conditioner refrigerants, foam packaging and food containers, fire extinguisher substances containing halon)

DESALINIZATION (DESALINATION)—A process for removing salt from sea water, usually to make it drinkable.

DEVELOPED AND DEVELOPING COUNTRIES—The "developed" and "developing" categories correspond directly to the United Nations classifications "more developed" and "less developed" for all nations. Developed countries include all nations in Europe, the Soviet Union, North America, Japan, Australia and New Zealand. All other nations are considered developing countries.

DISCONTINUITY—A sharp change in a direction or a trend; for example, an increasing population begins to decrease.

ELECTRONIC COTTAGE—Phrase that first appeared in 1980 in Alvin Toffler's *The Third Wave*. He predicted that millions of Americans would transform their homes, condos and apartments into living/working spaces as the United States shifted from an industrial to an information-based society. Americans would "telecommute" to work with home-computer terminals linked to the company's mainframe. Ten years after the publication of his book, 6.8 million Americans telecommute full time; another 20 million telecommute part time or while moonlighting. Total: 26.8 million.

ELECTRIC PROPULSION—Power for electric cars, usually from batteries and some time in the future by direct solar heat converted to electricity on the vehicle. See PHOTOVOLTAIC CELLS.

ENERGY—Inherent power; actual or potential ability to do work.

ENVIRONMENTALIST—Person working to solve environmental problems such as air and water pollution, depletion of natural resources, uncontrolled population growth, and endangered animal and plant species.

ESV—An experimental safety vehicle given rigorous tests before human use.

ETHANOL—Alcohol that can be made through fermentation of sugars from corn and other grains, also called grain alcohol, ethyl alcohol and spirits.

EXPEDIENT—Convenient to present situation without regard for long-term effects.

EXPONENTIAL GROWTH—An increase in a quantity by a fixed percentage rather than by increases of the same amount for each specified amount of time. The following is an example of exponential growth: A servant agreed to work for one cent the first day, but only if his employer agreed to double his pay each day. The servant received one cent for the first day, two for the second and four for the third. Doubling the four cents brought him eight cents for the fourth day. Sixteen cents was his pay for the fifth day, $5.12 for the tenth day and $10.24 for the eleventh. His pay reached $327.68 on the sixteenth day! Within a month, the servant would be a millionaire! Population increase in parts of the world is often described in terms of exponential growth.

EXTRAPOLATION—Extension or continuation of a circumstance of the past or present into the future, based on a premise that the rate or direction of change will continue as in the past. See TREND EXTRAPOLATION on pages 30-34.

FISSION—The splitting of atomic nuclei resulting in an enormous release of energy.

FLOATING CITY—A self-contained city designed to float on water. It could be built for up to 30,000 people and would contain schools, shopping centers, entertainment areas and sports complexes as well as businesses and industries suited to each city. Such cities could be manuevered from area to area for convenience or business. A fishing city might follow schools of fish and can or preserve the fish as they were caught. A resort city might move south in the winter and north again in the summer. See the mini-biography of R. BUCKMINSTER FULLER in the Reference Section.

FORECAST—A conditional statement about a future possibility; more research-based than a prediction. See PREDICTION and PROJECTION.

FREIGHTER (Ocean/Land/Air)—Ships, large trucks, and large cargo airplanes or balloons made especially for carrying materials and goods for long distances as effectively as possible.

FUSION—The joining together of hydrogen atoms to produce helium, in which process enormous amounts of energy are released. Ordinary hydrogen won't work; it must be heavy hydrogen, or deuterium.

FUSION, COLD—Fusion that can be achieved at room temperatures. Process assumes a theoretical particle that creates a fleeting union between a proton and an electron.

FUSION, HOT—Nuclear fusion where atoms are fused rather than broken apart as in nuclear reactors. It normally takes enormous heat to start the process.

FUTURE SHOCK—A term invented in 1970 by Alvin Toffler, author of a book by the same name, to denote the disorientation which occurs in people when rapid social change takes place. Toffler likened his term to "culture shock," used by anthropologists to describe adjustment problems faced by people who move and live with people of a different culture. Read about Alvin Toffler in the Reference Section under "21st Century Men and Women in the 20th Century."

FUTURICS—One of several terms used to denote the study of the future.

FUTURISM—A mood, or attitude, that acknowledges the importance of thinking seriously about the future; making plans now based on the available information and resources.

FUTURISTICS—The field of study that deals with possible future developments.

GENIUS FORECASTING—Actually a misnomer because it refers to intuitive forecasts of any "expert." Many experts have made decisions for the future based on a need to make a decision. Some decisions have been appropriate; others have not. H.G. Wells and Henry Ford both made a great number of forecasts, some of which did not come true.

GEODESIC DOME—Dome, or sphere, (or section of sphere) constructed by crisscrossing curved pieces of material in forms of triangles, curving the triangles to the top of the dome. An igloo is an example of a dome using packed snow or ice in triangular shapes for construction. The triangular shapes give the structure a strong architectural surface.

GEO-THERMAL POWER—Power generated within the earth from the heat such as found in geysers, volcanic rock, and pressurized rock.

GLOBAL JOINT-BUSINESS VENTURE—Cooperation between or among businesses/companies of different countries. These companies share in the work, planning, marketing, and profits. One example of global joint-business ventures is the automobile industry: Japanese and German companies work with American companies.

GLOBAL MOBILITY—Ability of nations and international agencies to allow people to move to areas where they are needed and to allow goods and materials to be moved to places where they are needed.

GREY POWER—Reference to the potential future social and political influence that might be exerted by senior citizens and retirees, particularly as the number of older people increases due to advances in medical and health technologies.

HYDROGEN FUEL—Liquid hydrogen from solar energy; considered the fuel of the future. Hydrogen as a fuel is completely cyclic. Water taken from the ocean can be electrolyzed, producing hydrogen which can be used as a fuel and then returned to the atmosphere as water. Hydrogen in its liquid form can be used in gasoline engines without motor modifications.

INFLATION—Increase in the amount of money in circulation resulting in a decrease in its value and purchasing power.

INTERNATIONAL RELATIONS—Political science dealing with foreign policy and relationships between nations.

INTUITIVE FORECASTING—Any method of forecasting that relies chiefly upon subjective judgment or personal feelings about what might happen. Look up "Genius Forecasting" in the Projections and Forecasts Section.

L-5—Area between earth and the moon where the moon gravity influence is equal to that of the earth, resulting in a no-gravity environment. Gravity on earth causes the separate molten elements of a metal compound to layer with the heaviest at the bottom. In a no-gravity environment such as L-5, the elements could be completely mixed and the resulting compound could have new properties regarding strength, flexibility and uses.

LASER—Basically, a machine that produces a beam of concentrated light of a specific wave length; a highly concentrated energy beam.

LATCHKEY KIDS—Students who leave school and return to empty, unsupervised homes. These children have keys or other access to their homes.

LIFE EXPECTANCY—The number of years a person is expected to live, based on statistical probability and trends.

LINEAR TREND EXTRAPOLATION—Extension of a trend or pattern in a straight-line fashion. Linear forecasting suggests that a trend will continue unchanged into the future. See EXTRAPOLATION.

MASER—Similar to a laser except that it generates microwaves instead of light. At the collection point, the microwaves are converted back into electric current.

MEGALOPOLIS— A supercity. As the world population increases, supercities could emerge through combinations of large cities, environs, suburbs, new housing areas, and communities in between. Most supercities of the future are expected to expand up as well as out. Mexico City is projected as a supercity with over 31 million people by 2000. Other megalopolises seem to be in the making, with many large metropolitan areas running together. Boswash might be a name for a future megalopolis extending from Boston through New York and Philadelphia to Washington, D.C. On the west coast, SanSan might be a good name for a supercity extending from San Francisco to San Diego.

MILES PER BUSHEL—As more and more grains are converted into fuel for gasoline engines, people using that fuel might think in terms of how many miles can be obtained from each bushel of grain.

MONORAIL—Single rail on which a train or other vehicle travels; a railway system using a single rail.

NEGATIVE EXTRAPOLISTS—Futurists who extrapolate trends from the past into the ruination of the future.

PEOPLE MOVERS—Large systems of conveyors, moving sidewalks and escalators designed to move large numbers of people in a very short time. This system of transportation is planned for use at airports, under shopping centers, and at train and bus stations.

PHOTOVOLTAIC CELLS—Solar collection units that convert sunlight directly into electricity.

POPULATION BULGE—Term used by population researchers to describe the movement of the large numbers of babies born within a few years after World War II. As they grew older, they passed through different stages as a group. This is also referred to as the post-war "baby boom" and the people as "baby boomers."

POPULATION GROWTH RATE—Difference between a death rate and a birth rate per 1,000 people in a given area or country and within a specified time. If the birth rate is 30 per year for each thousand people, and the death rate is 12 per year for the same number of people, the population growth rate for that period of time is 18 per thousand people per year. See ZERO POPULATION GROWTH.

POSITIVE EXTRAPOLISTS—Futurists who project the best trends of today into the future.

PREDICTION—Statement about something that seems like it might happen. Rarely used by futurists except in the negative sense. See FORECAST, PROJECTION, and PROPHECY.

PROJECTION—Forecast based on current trends.

PROPHECY—Statement about the future made without a detemined basis in research or without supportable rational evidence. Futurists deal with trends and alternatives. They make forecasts and projections rather than predictions or prophecies.

RE-UNIFICATION—To consolidate after being separated. In 1989 and 1990 Germany, which had been divided since the end of World War II (1945), went through a process of re-unification.

SATELLITE—Previously, a moon connected with a planet or planetary system through gravitational forces. Since the start of the Space Age, artificial, or man-made, satellites have been directed past other planets in the solar system.

SENSOR—A computerized electronic device that senses needs or problems before they occur. Sensors can warn the operators of a machine or take steps to alleviate a problem, depending upon how programmed. Automobiles of the future will have sensors which will provide a greater degree of safety. Sensors will automatically turn on headlights, lower the high beams, slow the car down for stop lights and signs, tell the driver when the gas supply is low, and even steer the car past a danger area detected by the sensor.

SHRINKING WORLD—Reference to the fact that while the physical world remains constant, distant regions and people become more accessible through telecommunications and improved transportation.

SOCIAL PROGRAMS—As used in this book, social programs are those that deal with people who need food, housing, and futures. Social programs would attempt to provide assistance for people who have been displaced by wars or natural disasters or who need food or other basic necessities for survival. These programs would require budgets as great as those of the space exploration program and/or war budgets.

SOCIAL WELFARE SERVICES—Government services organized for the benefit of all people, but especially the disadvantaged.

SOLAR ELECTRIC CELL—A battery that runs on energy collected from direct sunlight and converted into electricity. See PHOTOVOLTAIC CELLS.

SPACE CITY—The next step after the establishment of space colonies. If the scientists who establish space colonies are to be considered the explorers, the inhabitants of a space city might be considered the settlers.

SPACE COLONY—A colony of people, pioneers in effect, but space technicians primarily, who live and work on man-made satellites or in protected environments on the moon.

SPACESHIP ETHICS—An image of Earth as a self-contained unit emphasizing a need to consider the Earth as a single, whole unit; a need to make intelligent use of its resources; a recognition of the basic and essential oneness of humankind. Implied is a moral code based on the need for cooperation of all people, all passengers on the Spaceship Earth.

SPACE SHUTTLE—A large rocket that leaves Earth with the help of rocket propulsion and that can be piloted and returned to Earth. The first rockets that left Earth's atmosphere were not capable of re-entry and landing on Earth. The space shuttle can be used many times, as opposed to the one-time use of the first rockets.

SPACE TELESCOPE—A telescope placed in orbit above the heavy atmosphere of the Earth. Such a telescope can be used to study solar system phenomena and stellar objects with greater clarity and accuracy than any land-based instrument. A space telescope could be either a lens-and-light telescope or a radioscope. Observatories will be important parts of future space colonies.

THERM—Unit of heat; one therm of natural gas is equal to a gallon of gasoline in terms of energy.

THERMONUCLEAR—Relates to the change in the nucleus of atoms (such as in hydrogen) that requires a high temperature.

TREND—A pattern of events which have occurred over an extended period of time in the past, indicating a tendency or direction that might be repeated. Used with caution by futurist researchers.

WELFARE—State or condition of well-being. See SOCIAL WELFARE SERVICES.

ZERO POPULATION GROWTH (Z.P.G.)—A time when the rate of deaths will approximately equal the rate of births. Considered by some to be necessary to protect the welfare of the existing population.

ADD new words that you have found in your class activities. You can define them on this page, or you might want to list them here and define them in your journal or your notebook.

Thinking-Skill (Process) Verbs

These verbs have been drawn from two sources: Bloom's Taxonomy and Guilford's Structure of Intellect. Since dual sources were used, the lists could be headed in different ways. Note, for example, that List I could be identified as either KNOWLEDGE (Bloom) or MEMORY (S.O.I.). List II could be headed as either COMPREHENSION (Bloom) or COGNITION (S.O.I.). Lists III, IV, and V have been provided with their alternate titles in a similar manner.

LIST I ***Knowledge/Memory***	**LIST II** ***Comprehension/Cognition***	**LIST III** ***Application/Convergent Production, Transformation***
IDENTIFY	REWORD	SOLVE
RECITE	CONVERT	ADOPT
SHOW	EXPAND	UTILIZE
REPEAT	RETELL	EMPLOY
LOCATE	RESTATE	USE
LIST	EXPLAIN	TRY
CHOOSE	OUTLINE	PROFIT BY
LABEL	ACCOUNT FOR	OPERATE
SPELL	SPELL OUT	DEVOTE
POINT TO	ANNOTATE	PUT IN ACTION
MATCH	TRANSFORM	PUT TO USE
FIND	CONSTRUE	

LIST IV ***Analysis/ Convergent Production***	**LIST V** ***Synthesis/ Divergent Production***	**LIST VI** ***Evaluation***
BREAK DOWN	CREATE	JUDGE
LOOK INTO	COMBINE	APPRAISE
EXAMINE	BUILD	WEIGH
TAKE APART	MAKE	REJECT
DIVIDE	REORGANIZE	DETERMINE
DEDUCE	CONSTRUCT	ADJUDGE
INSPECT	BLEND	ARBITRATE
TEST FOR	GENERATE	RULE ON
SEARCH	EVOLVE	CRITICIZE
CHECK	ORIGINATE	CENSURE
SIFT	CONCEIVE	CLASSIFY
STUDY	FORMULATE	GRADE

Recommended Further Reading

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The following periodicals are recommended for students interested in future studies:

Futurist, The
Discover
Omni
Popular Science
Science Digest
Technology Illustrated

These are recommended as general news magazines that often have pertinent futurist-related topics and information:

Newsweek
Time
Readers Digest

Two leaflets can be ordered from the North American Coordinating Center for Responsible Tourism, 2 Kensington Road, San Anselmo, CA 94960: "Third World Travel: Buy Critically" and "Responsible Cruising." A self-addressed, stamped envelope is requested.

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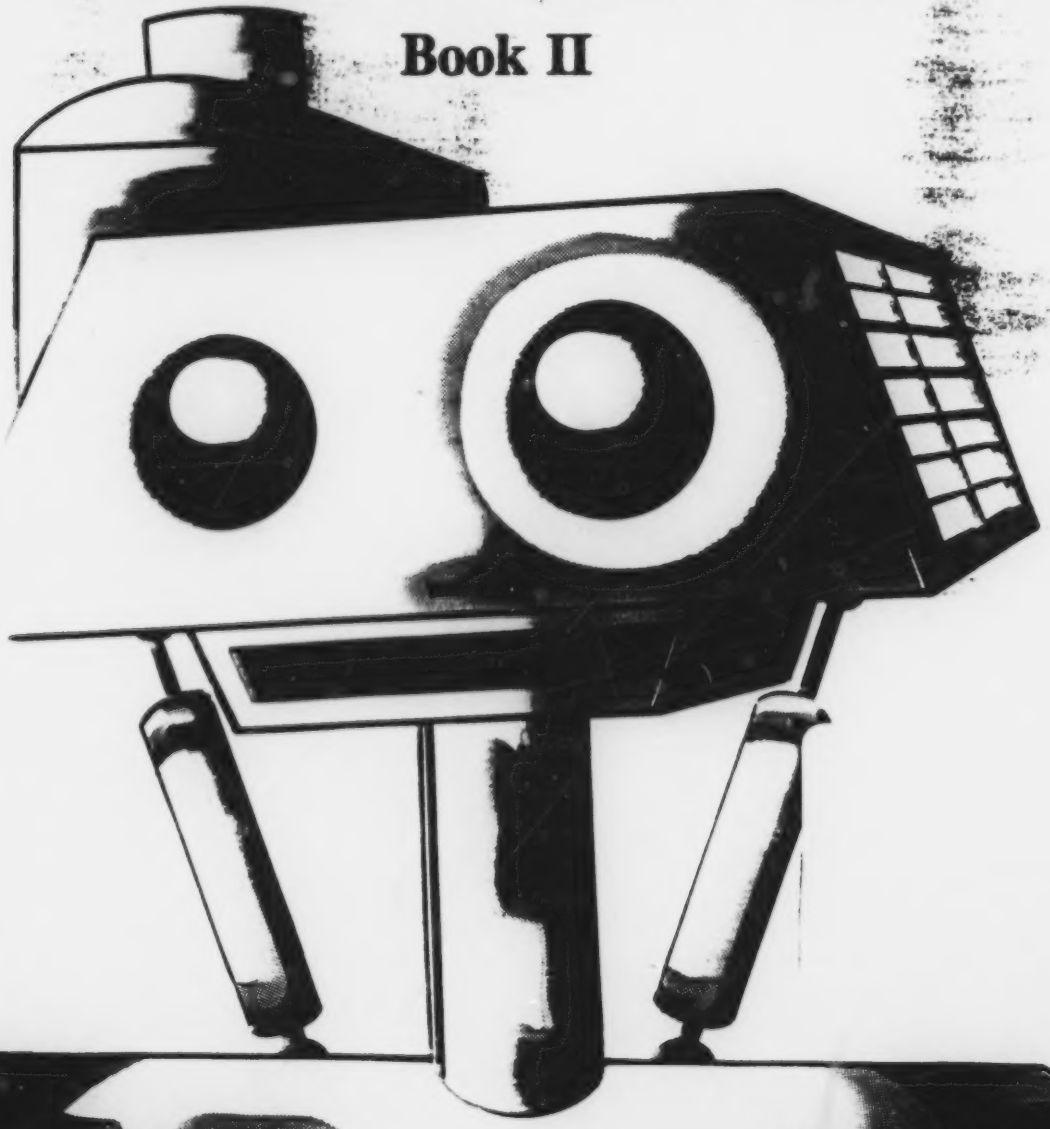

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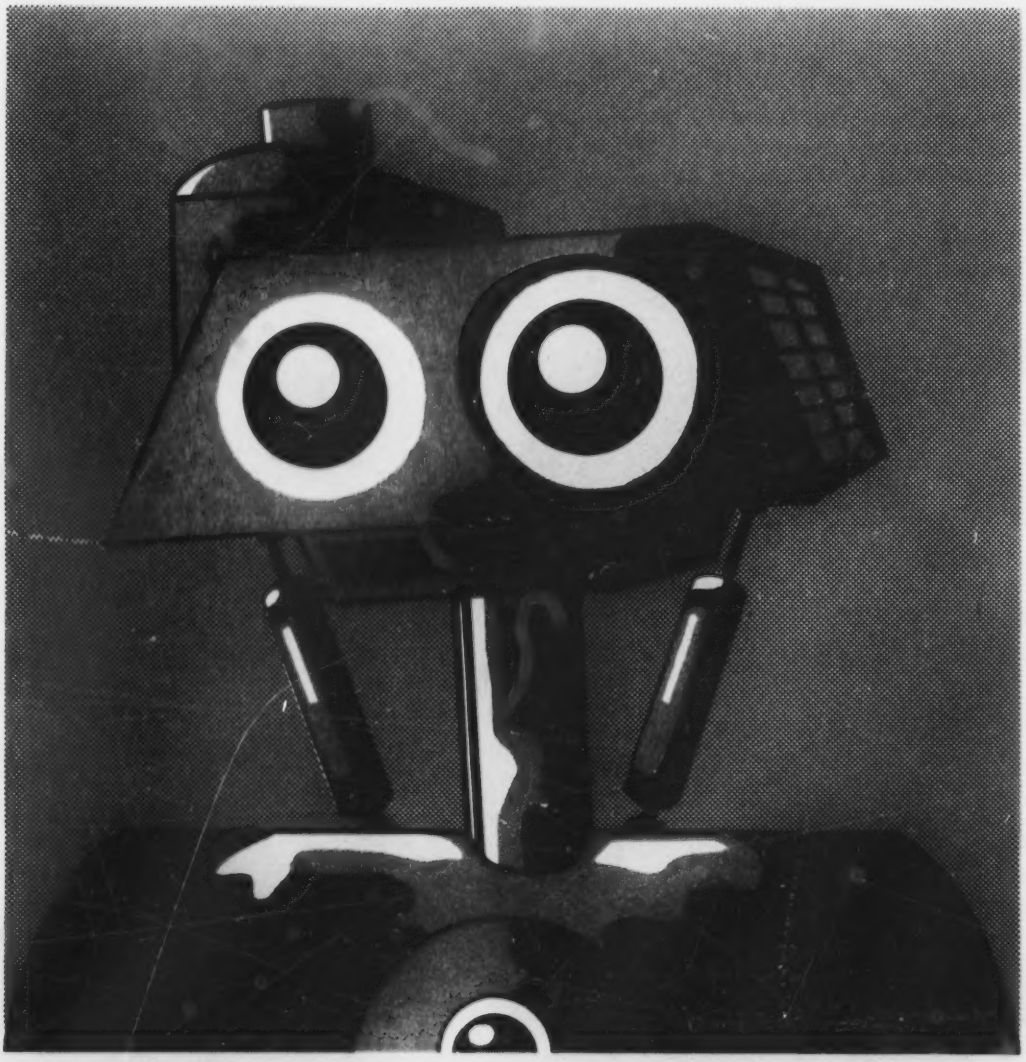

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The authors met in World Future Society activities. Both firmly believe that Future Studies deserve a greater emphasis in the schools.

A NOTE FROM THE AUTHORS

In July 1981 29-year-old Andy Lipkis had a dream: to plant a million trees in the Los Angeles area for the 1984 Olympic Games. On July 24, 1984, a week before the start of the games, Lipkis and his organization, TreePeople, were only 60,000 seedlings short of their goal!

Enlisting the aid of corporations, government agencies, community leaders, politicians, religious organizations, and more than 200,000 individuals, Lipkis and TreePeople led or supervised plantings that stretched across five counties.

Although the new trees were only knee high at the time of the Olympic Games, their impact ten to fifteen years later would be significant. City planners forecast that the trees could filter as much as 20% of "particulate" pollution out of the air.

Johnny Carson made large contributions to the tree campaign, Gregory Peck taped a public announcement for the group, and June Lockhart planted ten cypress trees in front of her home.

Lipkis commented, "I see us [TreePeople and volunteers] as representing the Nineties and beyond."

We want you, too, to represent the 1990's and beyond, and this workbook might be the vehicle which will motivate you to seriously analyze your present environment and your future. When will you "plant a million trees"?

Eldon M. Meyer
Donald D. Zielinski

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Preface

Future Options Unlimited is a series of student-oriented workbooks which deal with future studies and which focus on three areas: 1) our present-day world is undergoing a series of rapid and convulsive changes; 2) those of us who understand these changes and adapt to them can prepare for the future and avoid future shock; and 3) future options are available, and we can intelligently select from them.

Future Options Unlimited has been designed for grades seven through twelve (five through twelve, gifted), although it could be used as a resource for other grade levels. Talented students will be able to use these materials with a minimum of teacher assistance.

The uses of newspaper and periodical items in ***Future Options Unlimited*** are examples of materials and topics readily available to the student-futurist from local news sources. The procedures described in the lessons and assignments can be replicated using other newspapers and other future-oriented news articles. Teachers and students are encouraged to supplement the items with current, updated news stories and materials from their own local newspapers and periodicals.

Assignments are intended to have reference to a rapidly-changing world and to relate to students' personal growth and understanding. There are no answer sheets. Evaluation is based upon student participation and involvement. The teacher role can be expanded from instructor to include advisor, counselor, and companion on the path to the future.

Above all, the program is geared to students' future needs as adults.

The Authors

Teacher
Section

To the Teacher

This section has been designed with one major purpose in mind: to make ***Future Options Unlimited*** an easy-to-understand, easy-to-use teaching aid that will strengthen your future studies program.

"There seems to be a great deal of work for the students" was a recurring comment from those who were asked to preview the workbook. In answer to this, we would like to point out that ***Future Options Unlimited*** is a *flexible* unit. Teachers may choose as little or as much of the material as they wish. What's more, the unit may be presented at any time of the year. Our hope is that the material will be used on a consistent basis throughout the year. But it is your choice!

The heart of the workbook consists of four RESEARCH units, a FUTURE FORCE section, and a REFERENCE section. Each research unit involves the students in most of the following: debates, forecasts, research, reports, oral presentations, personal assessments, journals, notebooks, brainstorming, evaluation grids, and surveys. Future Force is a general introduction to the study of the future. The Reference Section has many important components, such as Mini-Biographies and What Futurists Have Said, which includes suggested activities. A Glossary defines many words that are used in the units.

Naturally, we look upon all aspects of the workbook as important. But there will be some who will use the journals and not the dictionaries or the notebooks. Some may bypass the debates. Others will be selective when they examine the research and report activities. Once again, the keyword is *flexibility* and may we suggest *creativity* and *imagination* as well.

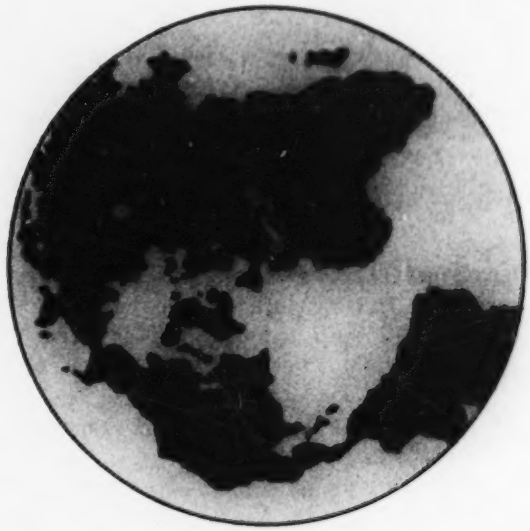
There is, however, one aspect of the workbook that is extremely important, and we strongly recommend that you do not omit it: the CPS (Creative Problem Solving) Grid. The brainstorming and the eventual selection of alternative solutions are integral parts of the workbook's structure.

As a last word, be FLEXIBLE. Use your IMAGINATION. And we are certain that you will be CREATIVE.

Now, let's move forward, for an exciting future awaits us all.

THE FUTURE

You and your students can expect to live in a different future—continually changing, predictable and unpredictable, exciting, frustrating, indeterminate, and/or chaotic. The extent to which you can understand and anticipate changes will to some degree determine the quality of life you will have in your tomorrow.



Future Options Unlimited is designed to aid you in presenting important concepts to students regarding future changes and how those changes might affect them. The workbook should not be considered a source for answers to predetermined questions, but rather a resource for students who are concerned about their tomorrows.

An important segment of *Future Options Unlimited* relates to pessimism versus optimism. Which are you—an optimist or a pessimist? When you think about the future, do you see it as better than today? Years from now, will the quality of life around you be richer, enhanced by fingertip sources of energy, improved by larger, less expensive housing and/or by access to bountiful supplies of food? Or will your future standard of living be compromised by extremely high-priced energy, out-of-reach housing costs, a need to share nearly everything, and an exploding national and world population?

You, a teacher-futurist, will be living in a part of the same future as your students. You are in a position to lead your students into an exciting adventure: an examination of the future and their role in that future. Your own research, your positive attitude, and your open responses will undoubtedly influence your students. Your perception of your role as a teacher-futurist is both important and critical.

Here are some of the significant questions that you and your students will address: Can futurists make valid forecasts? Is there only one future of which we are all a part? Or are there many futures? What kinds of utopias might people plan for? Or should they plan for disasters? Are there too many people on earth? What solutions might be developed in response to any population problems? With adequate planning, can the earth support six billion people? Eight billion? Fifteen billion? How many people do you think the earth can support?

An unlimited number of questions can be asked. A thematic concept, however, that appears in all of the questions and activities is this: Which alternative futures do you want and which don't you want? Helping students recognize alternatives in their future and helping them choose preferable futures might be your most important task as a teacher-futurist.

DICTIONARIES, JOURNALS AND FILES

One anticipated outcome of this introductory study of the future is that in the course of their research students will develop some ideas and concepts that will help them in their lives, both in and out of school. To achieve this outcome, students are assigned as a continuing project the organization and maintenance of three basic notebooks. It is very important that students keep these up to date. All three of these (the dictionary, the journal, and the file) could be placed in the same loose-leaf notebook, but we have found that three separate notebooks are more useful. This allows the teacher, for example, to check the students' dictionaries without having to contend with the bulk of the other two sections.

We recommend that the dictionaries and files be checked and graded on a regular basis. The students can also share their journals with you, but some of them might be reluctant to do this because of the nature of their entries; their privacy should be respected. Students should also be asked to share their new words, their clippings in their notebook, and appropriate journal entries with the class.

A FUTURIST'S DICTIONARY

This is a vocabulary notebook, set up in alphabetical order. New words can be added and placed in the correct order.

Assignments will introduce or suggest new words. These words should be immediately defined and added to the dictionary. Eventually, students might want to expand these definitions. For example, FUTURIST might be one of the first words in their list. A beginning definition might be "someone who studies the future." As students gain insight into future-related concepts, they might add to their definitions the idea that futurists "do not predict the future but study trends and alternatives for the future." By the end of the program some students might revise the definition even further by stating that a futurist "is one who systematically studies about the future to establish possibilities regarding living and working in the future. A futurist is sometimes referred to as a futurologist or a long-range forecaster."

The futurist vocabulary words will help your students understand and formulate new concepts. The word lists are valuable tools for them as they progress through study units, engage in research, develop reports, and involve themselves in other future-related activities.

A FUTURIST'S JOURNAL

This is a combination journal and notebook—something like a ship's log—where students can record their thoughts concerning the future as they engage in research and proceed through ***Future Options Unlimited***. The futurist's journal should contain most or all of the following: ideas and thoughts, observations, quotes, interesting statements and phrases, summaries of books, reactions to statements made by other class members and/or the teacher, future designs, recipes of the future, forecasts, and questions. The journal is important because it can reflect the student's growth in future-related thinking.

Some segments of the journal might be a basis for a class report. If your schedule permits, on occasion allow class time for the sharing of journal entries.

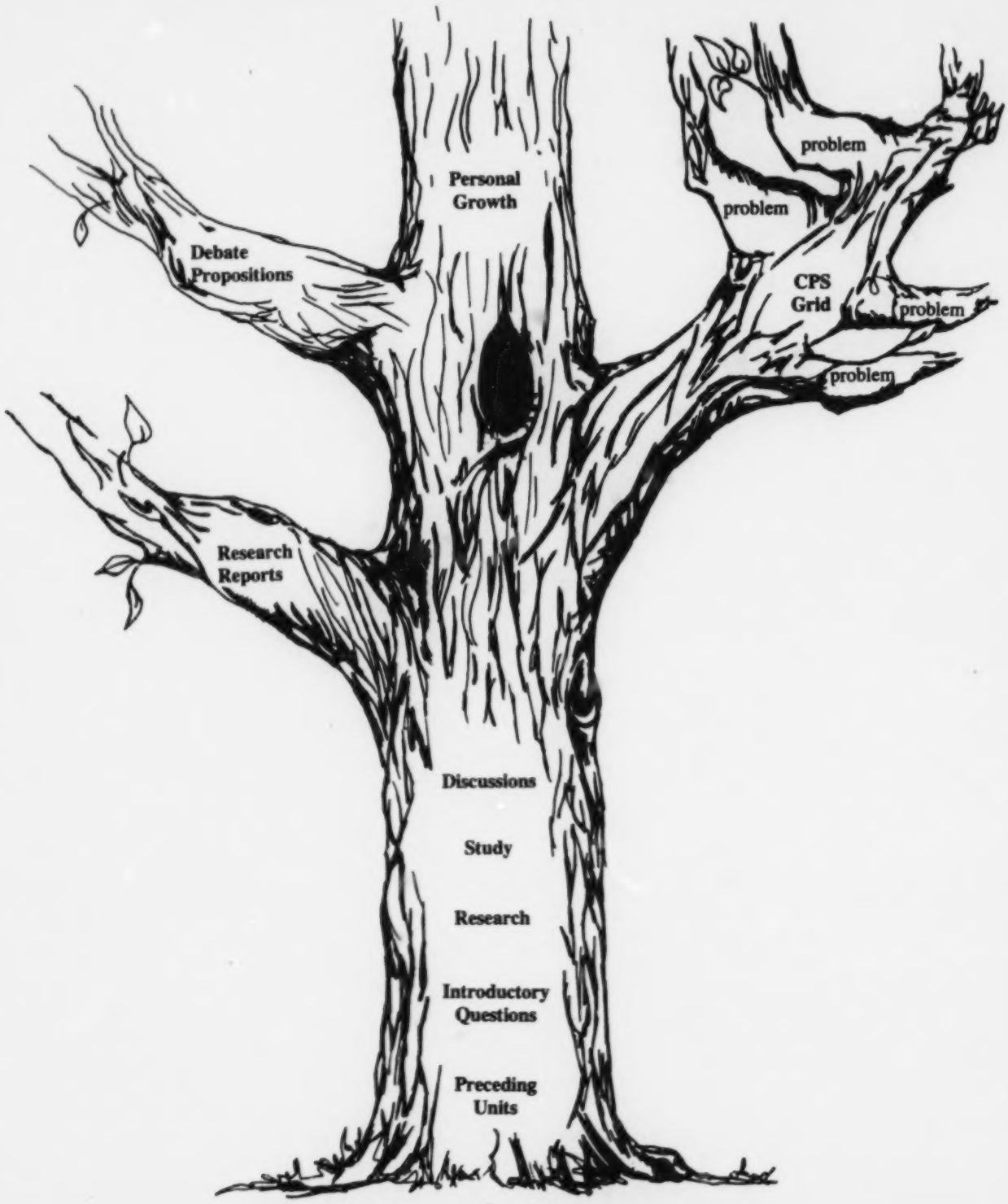
A FUTURIST'S FILE: Clippings and Articles

In their file students will place items relating to the future which they have found in newspapers and magazines. They should be instructed to note the date of each news item as well as the source.

Encourage the students to include other items in this file such as reviews, comments, and analyses of books and films dealing with future studies, science, or science fiction. Again, they should note the date and source of each item.

RELATIONSHIP TREE

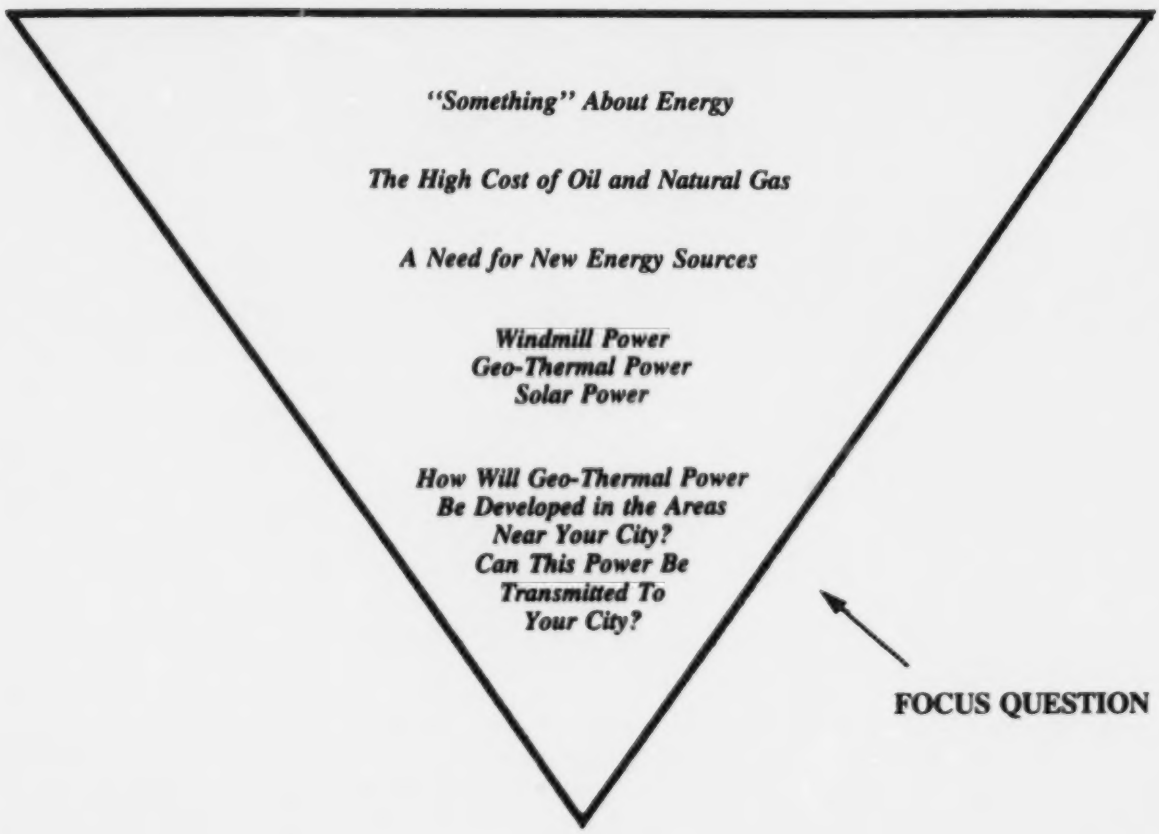
The questions and news items provided with each study unit serve as a basis for research, discussion, and oral and written reports. After the questions and the news articles have been explored, students move on to more sophisticated activities geared to individual and personal development, such as the use of the CPS grid.



GROUP AND INDIVIDUAL RESEARCH

There are many students who feel that research means opening a reference book in the library and copying a few interesting paragraphs or pages. One of your more important tasks, therefore, is to help your students develop a concept of investigative procedure. Two important facets of this task are the FOCUS QUESTION and the use of the THINKING or PROCESS VERBS (discussed later in this section).

It is important to establish the Focus Question before any type of research is initiated. Unless the students know exactly where they are going, a great deal of time can be wasted. The triangle below illustrates the progression from a rather vague idea through various refinements until a very specific target, the Focus Question, is reached.


"Something" About Energy
The High Cost of Oil and Natural Gas
A Need for New Energy Sources
Windmill Power
Geo-Thermal Power
Solar Power
How Will Geo-Thermal Power Be Developed in the Areas Near Your City? Can This Power Be Transmitted To Your City?
FOCUS QUESTION

RESEARCH AND REPORT TOPICS AND SUGGESTIONS

Futurism by its very nature is action oriented. There would be no need for future studies if all people were bystanders waiting for something to happen. This text assumes that students who will be living in the future will be concerned enough about that future to engage in many of these action-oriented activities.

Phase III-C of each unit, Individual or Small Group Action Research, uses action-oriented questions. Students present their work to the class based on your schedule.

ORAL REPORTS

The oral-report segment is very important because it combines so many basic techniques: outlining, public speaking, listening, and discussion. Students share their research with the class, and many important discussions arise from these presentations.

All students should be responsible for at least one oral presentation. Since time is a factor, you might want to have one fourth of the class make an oral presentatien for each study unit. It might be helpful to show the class how to "highlight" their written reports—that is, how to communicate the important sections of their research without reading every word. This can be done in conjunction with a discussion of outlining.

The class should also be trained in listening skills. As the student reads and presents his or her report, class members should take notes, preparing to ask questions at the conclusion.

As you grade the oral reports, look for the following: 1) Was there a logical organization to the report? 2) Assuming the report was well structured, did the speaker transmit the information to the audience? 3) Did the speaker maintain eye contact with the audience? 4) Did the speaker display poise and use acceptable vocabulary? 5) And lastly, was the speaker able to support the thesis of the report during a question-and-answer period?

SURVEYS

The students can start their survey experiences with very simple questions which are asked in a friendly environment and then move into more complicated situations.

To start, the students can survey members of their home. The students should not feel threatened in this type of situation, and the survey instrument can be simple, using yes-or-no or simple multiple-choice questions. The students may also wish to submit questions to neighbors in the immediate vicinity of their homes. At this stage, they might begin by asking a yes-or-no question; for example, they may ask, "Are you concerned with the world's increasing population rate?" This might be followed by a simple multiple-choice question whose options would list various acceptable limits to the world's population: 10 billion, 20 billion, and so on.

Students might then progress to a middle stage by visiting several classrooms in the school and asking several hundred students their opinions on a particular subject. The questions at this point should be more complicated. The interviewees might be asked to rate their preferences for alternative futures by using a 0-10 scale. Fill-in-the-blank questions could also be used.

In the final stage, the students might go to shopping centers or other public places. In addition to the types of questions mentioned above, open-ended ones might be added. These, of course, are more difficult to tabulate. The following is an example of an open-ended question: In twenty-five years the two most profound changes in our society will be _____

_____.

The results of all surveys should be presented to the class, and discussion should follow each presentation.

DEBATES

Among the project activities suggested in Phase III of some of the study units are debates. Placing three students on each team has proven to be a successful format, although two students per team will do on occasion. Each group of three must determine which aspect of the topic to cover. The strongest debater of the three should be placed last because this is the member of the team who not only makes important contributions of his or her own, but also summarizes the presentations of the other two.

Since debate topics are worded to argue for a change in a present condition, the AFFIRMATIVE position is considered the more difficult, and this team is allowed to speak first. The order of presentations in this modified debate program is as follows:

1. 1st speaker for AFFIRMATIVE: makes the introductory remarks and possibly provides a history of thought concerning the topic
2. 1st speaker for NEGATIVE: same role as above
3. 2nd speaker for AFFIRMATIVE: expands the position of the first speaker by providing supporting statements and facts
4. 2nd speaker for NEGATIVE: same role as above
5. 3rd speaker for AFFIRMATIVE: combines the arguments and positions of the first two speakers and presents a powerful plea to the judges (the class) that the AFFIRMATIVE position is the correct one
6. 3rd speaker for NEGATIVE: same role as above

The next phase is the REBUTTAL PHASE. The speakers are given time to criticize the statements of the opposing team. This segment should be held to a two-minute maximum for each speaker. The order of the presentations are now reversed: NEGATIVE speakers are followed by AFFIRMATIVE speakers.

The last phase is the QUESTION-AND-ANSWER segment. A moderator, who has been seated between the two teams and who has provided direction up to this point, can control the questions from the class so that both positions receive approximately the same number of questions.

SCORING

Each member of each team is given a score for his or her efforts in three different areas: the introductory presentations, the rebuttal critiques, and the question-and-answer period. This means that there will be nine scores for each debate team. An easy scoring system is 0-10, with 10 being the highest:

10: A plus
9: A
8: B
7: C
6: D
5: D-
4 and below are variations of F

At the conclusion of the debate, you may select seven students to place their cumulative scores on the blackboard. These seven cumulative scores are added, a grand total is obtained, and the victorious team is announced.

A more complicated procedure (but certainly acceptable) is to give the scores of **all** the judges (class members) to a student who will add them overnight. This student will announce the winner on the day following the debate.

BRAINSTORMING

Brainstorming is a valuable technique in the classroom because it allows the group to work together to solve problems. It also provides for "piggybacking," allowing one student to "hop on" another student's idea and create still another idea.

The teacher or a student will write **all** the ideas on the board. However the teacher must first explain that any thought or idea is acceptable. No student is to criticize nor laugh at any of the ideas. This objective climate is extremely important so that all ideas are expressed. The class should be encouraged to use imagination, to offer as many ideas as they wish, to piggyback on the ideas of others and, above all, to be creative!

THE EVALUATION GRID

The Evaluation Grid in the Reference Section was taken from *Away with Problems!*, written by Marilyn Brown et al. Ms. Brown, in turn, acknowledges the work of Dr. Sidney J. Parnes and Dr. E. Paul Torrance, two leaders in the field of educational creativity.

To use the grid you must first select a problem that needs to be resolved. Let us say it is in the field of energy. Perhaps one of your students suggests the following: How are we going to face the problem of decreasing reserves of fossil fuels?

The next step is to write on the board all the alternative solutions suggested by the class. Help the students use the brainstorming technique to produce the ideas. Star the ten solutions that the class considers the most appropriate. The students will write these on their grids.

The next task is to select criteria. Place one criterion in each of the categories marked "A" through "E." For example, the words WORTH THE COST might be placed under Criterion A; AVAILABILITY might be written in the space for Criterion B; and so on. Brainstorm with the class to select the five criteria.

Now each student rates the solutions against the criteria on his or her grid. For example, a student may give Proposed Alternative Solution #1 a rating of 8 against the first criterion and 9 against the second criterion. That same student may decide to rate Proposed Alternative #2 only 6 and 5 against the same criteria. The students should be instructed to rate all the solutions against the same criterion before moving to the next. In other words, they are to move down before they move across. Each rating number should be used only once per criterion.

After they have placed all the scores on the grid, the students total each solution's points horizontally and place the figures in the TOTALS column. They then rank the solutions, putting the highest scores at the top.

In order to reach a class consensus, the students are placed in groups of two, then four, then eight, and possibly sixteen. In each of the groups the students must use a NEGOTIATION procedure, a give-and-take discussion, to reach an agreement regarding the rankings. Student A, for example, may "trade" a ranking in one area if Student B will do likewise in another area. The final two or three lists should be placed on the board for class discussion and consensus.

The two or three Proposed Alternative Solutions which receive the highest scores in the TOTALS column can be assigned as Phase IV (Creative Problem Solving) projects. One third of the class, for example, would investigate the Proposed Alternative Solution which had the highest point total; one third of the class would deal with the Proposed Alternative Solution which had the second highest point total; and one third of the class would work with the Proposed Alternative Solution which had the third highest point total.

Each group would use library research, interviews, surveys and other methods to demonstrate that its Proposed Alternative Solution was the best. A written or oral report would complete the project.

REFERENCE SECTION

The Reference Section is an important part of this workbook. There is a WHAT SOME FUTURISTS HAVE SAID section with many useful project ideas; a GLOSSARY, which can be expanded into a year-round project; a READING LIST with excellent sources; student reference forms, entitled GETTING READY FOR THE FUTURE; and an EVALUATION GRID. The student forms and the grid will be used four times, once for each study unit. These pages should be duplicated for the students.

THINKING SKILL (PROCESS) VERBS

An important aspect of teaching is to lead your students to higher plateaus, to higher levels of thinking. Two educational theorists, Benjamin S. Bloom and J. P. Guilford, developed classifications and strategies which identify these higher levels. The verbs in this list can assist you as you urge your students to move from a simple knowledge of the material to more sophisticated concepts such as analysis and synthesis.

At the beginning, you might want to concentrate on the areas of knowledge, cognition, and application (LISTS I-III). As you progress, you will want to move on to the areas of analysis and convergent production (LIST IV) and then to synthesis and divergent production (LIST V). Eventually, you will want the students to operate at the level of evaluation (LIST VI).

The following are examples of how the verbs from LIST VI would be used to encourage students to use the higher-level thinking skill evaluation:

1. **Appraise** the efforts of the nations of the world to control nuclear warfare.
2. **Criticize** the arguments of those who state that coal should be the only replacement for oil.

FOUR-PHASE UNITS

This is a suggested outline you might wish to follow. However, you may want to include some of your own materials and extend the unit or you may wish to omit some of the activities to accelerate the unit. The amount of time spent on each lesson will vary.

INTRODUCTION

The class reads the list of questions which appears at the beginning of each unit. Discussions and/or observations may occur at this point, and you may not wish to stop these. You may even want to add student-developed questions. By the end of lesson, however, the students should have selected their questions from the INDIVIDUAL RESEARCH and GROUP RESEARCH areas. Try not to assign more than two students to a GROUP RESEARCH question if possible. All students answer the INFORMATION QUESTIONS.

WORDS TO KNOW

Students find definitions for the words on their WORDS TO KNOW sheets. The definitions can be found in dictionaries or in the GLOSSARY in the Reference Section.

A limited discussion may take place at this time. In the first unit, for example, the word "megalopolis" can be discussed; you could possibly describe the belts of population that stretch from point A to point B, such as Boston to Baltimore or Los Angeles to San Diego. If some students finish early, they can work on their assigned research questions.

PHASE I

Students read the articles and answer the questions in the section entitled REACTION TO THE ARTICLES. Call on some students to read their work to the class; a class discussion can ensue at this point.

PRACTICE GRAPH

Use the practice graph located in the Reference Section and allow the students to develop extrapolations/projections about the topic. After they have completed the graph, a class discussion might precede their efforts to complete the page entitled FORECAST. This provides the opportunity to use today's realities and statistics to forecast future developments in eras twenty-five and fifty years hence (or whatever time segments you choose).

PHASE II

At this point the students inject their forecasts into a society of the future. They are to deal with the impact of their forecasts upon the cultural/socio-economic fabric of a world that will exist (as an example) twenty-five years from now. If, for example, they have forecast a world in which there are no gas-driven vehicles, then what impact would this have on OPEC? On a typical car owner? On our nation's economy? On several governments that have heretofore depended on oil revenues? On international relationships?

PHASE III-A

The first few days can be devoted to library research and/or the final revisions of the research topics. They can also be used by the students who will participate in the debates to continue their research and conferences.

Students present their reports to the class. Due to time limitations, all of the reports may not be heard. You may wish to select those to be read, you may ask for volunteers, or you may choose to have the class decide which reports they want to hear. (Ten to twelve reports over a period of three days is the suggested number.)

Communication is an important aspect of our industrialized and technological world. The students who are in front of the class should make sure that their material has been well organized, carefully outlined, and logically sequenced. The audience, on the other hand, should refine their listening skills, taking notes as they hear the reports.

PHASE III-B

The debate teams support/reject the proposition that was selected. The procedure was previously discussed in the DEBATES section.

PHASE III-C

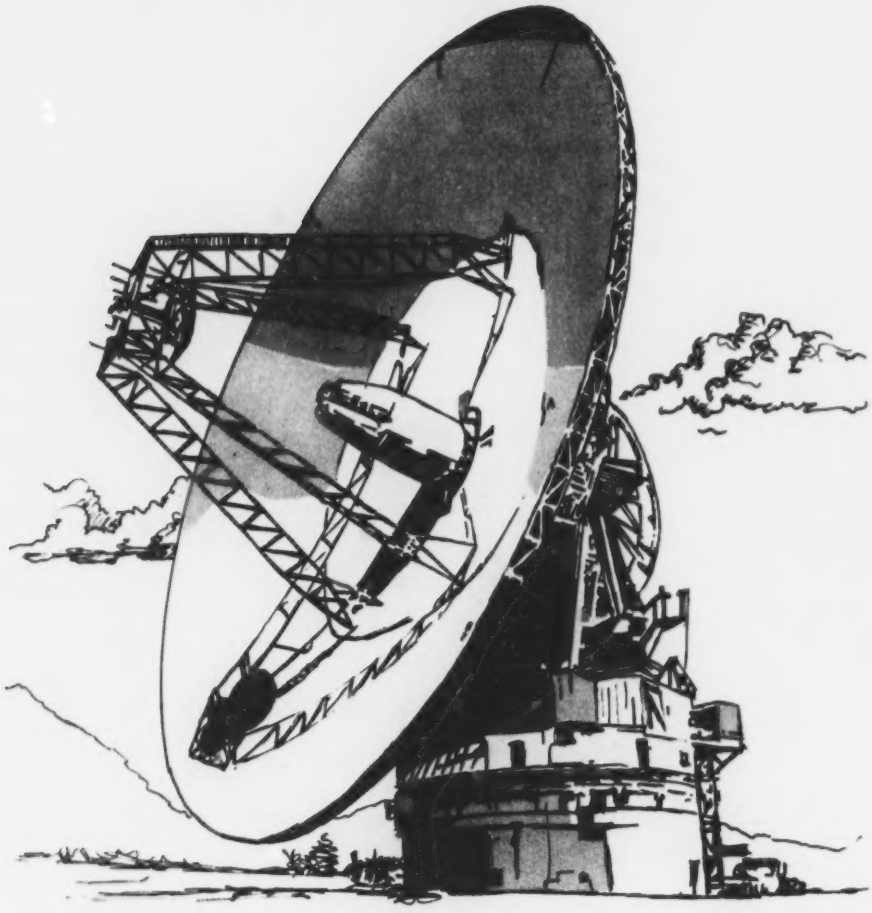
Students present the results of their work in the action-oriented research field. These may be surveys, interviews, murals, slide presentations, etc. A list of suggested activities is presented in the workbook. You may wish to replicate some of these findings and distribute them to the students.

PHASE IV

Either you or your students select one or more problems. Brainstorm for solutions and criteria and complete the EVALUATION GRID. Instructions have been previously given.

FUTURE OPTIONS UNLIMITED
Student Section

It's YOUR future



STUDY THE FUTURE...

with Friends

Introduction

Future Options Unlimited is based on a premise that learners have an interest in potential changes that will affect their future. In the "Note from the Authors" in Book I is the following statement:

> Future Studies has a weighty responsibility because it attempts to view a world characterized by rapid and continual change. Decisions must be made today that will insure the survival of humanity on this planet and, at the same time, hopefully enhance conditions and provide medical care for all.

These few sentences summarize the basic premise of the series: Future studies is important because people must prepare for decisions regarding the human condition and the preservation of the environment and the planet.

This second workbook has been designed to stand as a separate entity, but Book I can provide valuable material in the text as well as in the Reference Section. Teachers may begin a future studies unit with either workbook.

Each volume contains important and crucial issues which all of us must face in the future. These are the issues in Book I:

1. Population, Life Expectancy and Housing
2. Energy
3. Space Exploration and Social Welfare
4. Transportation and Global Mobility

Book II also deals with four issues:

1. Communications, Silicon Chips and Robots
2. Work, Leisure, and Education
3. Health/Medical Technologies and Your Life
4. Values and Expediences

The philosophical underpinning for Book II was the same as for Book I. Beyond the basic premise previously described, objectives remain the same:

1. Students will learn futurist terminology and philosophy and will sample the writings of prominent futurists.

2. Students will learn that the study of the future has become a science of forecasting, but not of prediction.

3. Students and teachers will discuss and analyze options—alternative futures—and the concept of self-fulfilling prophecies.

4. Students will see the future as a part of an historical continuum: the rich heritage of the past, a momentary present, and a challenging future.

5. Students will recognize the role of exploding developments in science and technology.

6. Students will study the role of an extremely important ingredient of the future—THEMSELVES!

7. Students will learn futurist research techniques: genius forecasting and trend extrapolation in Book I and scenario and Delphi Technique in Book II.

8. Students will examine global relationships which affect economics and values.

9. Students will evaluate technologies and their impact on present-day society and the future.

10. Students will study value systems based on long-range needs as opposed to expedient interests concerned only with current situations.

As in Book I, students are directed to maintain journals, notebooks, dictionaries, and files of newspaper and magazine articles. These clippings evolve into the CLASS FUTURE STUDIES LIBRARY, providing resource material for debates, research projects, surveys, political speeches, and other assignments.

Critical thinking is a cornerstone of the activities. Enrichment exercises include debates, political speeches, creation of a newspaper, and public-speaking exercises.

One extremely important part of the workbook is the CPS (Creative Problem Solving) Grid. The brainstorming sessions and the eventual selection of alternative solutions for future-related problems are integral segments of the workbook's structure.

This workbook is based on still another conviction: The time has arrived for future studies to be part of the curriculum. Futurist Wendell Bell made the following observation as he commented on a shift in education: "To escape the pull of present and past and open our intellects to the real possibilities for the future may require an effort analogous to the energy required for a space capsule to escape the gravitational field of the Earth." It is important for all of us to make this effort. If we do, we will...

TAKE A STEP TOWARDS A BIGGER AND BETTER FUTURE!

Your First Assignment Regarding Your Future: WRITE your own definition of a futurist. Include what a futurist might do and why. Refer to page 21 for information about starting a Futurist Journal.

Let Your Workbook Work for You!

One of the most important parts of this workbook is the list of OBJECTIVES in the Introduction. The activities and concepts expressed in these objectives are the basic principles underlying the study units and they provide the guidelines as you work toward your goal: becoming a futurist. Study the OBJECTIVES and notice the areas covered. List four objectives below:

1. _____

2. _____

3. _____

4. _____

Which of the objectives in the list is most important? Why? _____

_____

Examine the TABLE OF CONTENTS. What is the pattern of organization? _____

_____

What are the titles of the four study units?

1. _____

2. _____

3. _____

4. _____

Futurists employ many techniques to forecast the future. What two futurist research techniques are featured in this workbook?

1. _____

2. _____

CREATIVE PROBLEM SOLVING is an important phase of the units presented in this workbook. Examine the Table of Contents. What are the two sections listed under CREATIVE PROBLEM SOLVING?

1. _____

2. _____

Examine the four study units. Describe the organization of each unit.

_____

_____

_____

What is the total number of excerpted news articles in the four units? _____ Which is the most interesting news article? Why?

_____

_____

_____

WRITING ASSIGNMENTS in your book start with a key instruction word in capital letters. Your responses should include your ideas and concepts. Share your answers with your class or your teacher. File your papers for your future reference.

Examine the REFERENCE SECTION. This is an important part of your workbook because you will use it frequently as you prepare your research papers and reports.

How many divisions are there in the REFERENCE SECTION? _____

List four of them:

1. _____

2. _____

3. _____

4. _____

Examine the section of mini-biographies and quotations; it is entitled TWENTY-FIRST CENTURY MEN AND WOMEN IN THE TWENTIETH CENTURY. Which of the futurists seems most interesting? Why?

_____

_____

_____

Which of the quotes is most interesting? Why?

_____

_____

_____

The GLOSSARY provides definitions for the WORDS SECTIONS and for your reports. List the four pages where WORDS SECTIONS are found: 1. _____ 2. _____ 3. _____ 4. _____

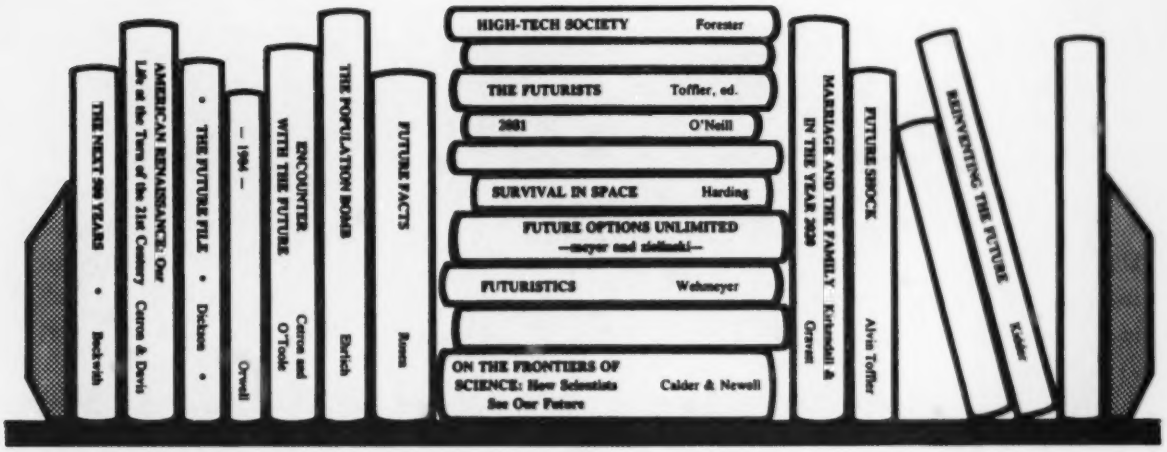
Select three words from your GLOSSARY. Write them and their definitions below:

1. _____

2. _____

3. _____

Discover some interesting books. Start by looking in the RECOMMENDED FURTHER READING section of this workbook. Add new titles to that list. Also add those new titles to the spines of the simulated books illustrated here.


THE NEXT 500 YEARS • Beckwith
AMERICAN RENAISSANCE: Our Life at the Turn of the 21st Century Cetron & Davis
• THE FUTURE FILE • Dickson •
— 1984 — Orwell
ENCOUNTER WITH THE FUTURE Cetron and O'Toole
THE POPULATION BOMB Ehrlich
FUTURE FACTS Rosen
HIGH-TECH SOCIETY Forester
THE FUTURISTS Toffler, ed.
2081 O'Neill
SURVIVAL IN SPACE Harding
FUTURE OPTIONS UNLIMITED —meyer and ziellinski—
FUTURISTICS Wehmeyer
ON THE FRONTIERS OF SCIENCE: How Scientists See Our Future Calder & Newell
MARRIAGE AND THE FAMILY IN THE YEAR 2020 Kirkendall & Gravet
FUTURE SHOCK Alvin Toffler
REINVENTING THE FUTURE Kahler

Turn to the GRAPHS section. After studying the graphs, select the graph which is the most interesting to you at this point. Why did you choose that particular graph?

_____

_____

Examine the THINKING-SKILL, OR PROCESS, VERBS page. Write a question using a verb from LIST I:

_____

_____

Now write a question using a verb from LIST VI:

_____

_____

Which question would be more difficult to answer? _____

On the lines below, list five ways in which this workbook can help you as you prepare reports and papers.

_____

_____

_____

_____

_____

161

News Items:
Keeping Up With Future-Related Ideas

Newspaper items, those excerpted in this workbook and others that you bring to class with you, will assist you as you research your own future interests.

These resources will indicate trends which in turn provide directions while you plan your personal future. Trends indicate changes taking place in your community, state and world that will affect the way you will live in your future.

What a Headline or a Heading Does

Pick up a newspaper. Large headlines at the top are intended to attract your attention. They are usually about feature stories that occurred on that day or the previous day. Look at the smaller headings, or titles. They serve the same purpose as headlines, but for specific items. The reader can, by looking at the headings, quickly find items of interest.

A recent newspaper, on page 3, carried these six headings, or titles, among others:

New Wrinkle on Smoking
State Faces Impasse on Budget Plan
Tentative Accord Reached on U.N. Security Force
Cyclone Victims Get U.S. Aid
Taxes Backed to Save Schools
Alaska, California Eye Undersea Water Pipeline

As you can see, a variety of subjects are covered. Do they give you information about what you would be reading, or do they only give you a hint to arouse your interest?

WRITE three of the headings on the lines below. After each heading, WRITE a, b, c, or d according to the following explanations. For some headings, you might use more than one letter.

a. Aroused your interest in the item
b. Gave you some important clue words about the item
c. Summarized material that appears in the item
d. Asked or implied a question to be answered

_____

_____

_____

As a futurist, EXAMINE the six headings and SELECT one that will affect your future. In your journal, DESCRIBE the impact of your selection on your future lifestyle.

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The article at the right describes trends that could affect your future job opportunities. The University of Houston in Clear Lake City, Texas, for example, has developed a major program to train people as futurists. The program merges students from many occupations for project interaction while they explore future-job potentials.

A new kind of job

UH/CLC turning out people who can take a long look at the "what-ifs" of the future.

Schools have sprung up to train [people]...in the examination of the years ahead and the alternatives for molding those years into a viable future.

Though the study of futuristics is new, job opportunities [requiring future-studies orientation] are growing rapidly. Dr. Mark Markley, [Chairman, Futures Study Program at the University of Houston at Clear Lake City] said, "Southwestern Bell called to say they needed someone to help tell them what they should plan for the shape of their service five to ten years out."

Another kind of job, Markley said, will be in forecasting changes in values that will effect business and government alike.

(Excerpted from *The Houston Chronicle*, March 2, 1990)

HELP WANTED

FUTURIST—needed to assist quickly growing company in formulation of 10-year production plan. College degree in future studies is mandatory. Practical experience helpful. Call Cella at 0-800-555-8767.

ROBOTOCISTS—Part-time and Full-time robotocists needed to maintain and manage fleet of robots in small, but growing company. Many benefits. Call 555-2300 and ask for R3 G10.

SOCIAL PSYCHOLOGIST—Culture-Fusion Social Psychologist needed to help integrate multi-cultural humans on recently populated space colony. Must have vast knowledge of customs, languages, values, etc. of various cultures. Long-term commitment necessary. For more information call 5-299-555-3000.

Put your imagination to work. LIST and DESCRIBE in your journal some jobs of the future that do not exist today. You might want to select a specific occupation, such as your father's or mother's, and describe the new jobs in that line of work. Keep in mind the effect that technology and computers will have on future work. Also consider social technologies needed for the rapid changes and adjustments anticipated in your 21st century.

A new breed of researcher and thinker has emerged from future-oriented programs. Would you like to be a member of this new breed? Do you really have a choice? What might you do? WRITE responses to these three questions and the questions in the next paragraph for use in class discussion regarding the reasons for studying the future.

In 1920 the author John Galsworthy stated, "If you do not think about the future, you cannot have one." Do you think that what he said over 70 years ago is appropriate for today or do you think it is outdated?

Your Future Notebooks

In the Introduction you examined the OBJECTIVES, a list of activities and concepts. As you engage in these activities and comprehend the concepts, you will become aware of the rapid changes occurring in your own environment and in the world. New ideas, new data, and new concepts—all of these are used in your forecasts as you plan your future and select one of the ***future options***.

Your forecasts and your future planning will be enhanced by the use of three notebooks: 1) a journal in which you will record your observations and critical comments; 2) a dictionary of future-related terms and words; and 3) a collection of newspaper articles and information dealing with future ideas.

As your study progresses, you will find many advantages for using looseleaf notebooks for your journal, your dictionary, and your collection of news items. You will have more flexibility and facility in alphabetizing, organizing, and adding to or changing your materials.

Your journal, dictionary, and file will be checked periodically. You will be asked to share your new words, news items, and journal entries with your class. WHAT might be the best reason for students to share their ideas and discoveries with others? How will sharing benefit you?

_____

_____

_____

YOUR FUTURIST JOURNAL

Your journal should contain, but not be limited to, the following: results of your own and class research, your survey results, your critical observations and comments from your reading, your notes during class, your evaluation grids, notes from television programs and newspapers, and your thoughts relating to future options. Here are specific suggestions for journal entries: 1) ideas and forecasts for the 21st century; 2) interesting excerpts from futurist magazines and books; 3) ideas reflecting class discussions; 4) futuristic designs for cities, cars, homes, clothing, factories, and educational programs; 5) games of the future; and 6) recipes for the future (e.g., seaweed hamburgers).

Record all of your future-related thoughts and observations in your journal. Indicate the date and the source whenever it is appropriate to do so. This journal will be a valuable resource for reports. The following might be a page in your journal:

_____

_____

_____

_____

DICTIONARY OF FUTURE-RELATED TERMS

Use a looseleaf notebook to set up a dictionary of future-related terms. Start with a separate page for each letter of the alphabet. New pages can easily be added in the correct location in your book as they are needed.

Add new future-related phrases and words as you encounter them. Share them with your class. HOW might the glossary in the Reference Section of this book help you with your dictionary?

_____

_____

_____

WHERE will you look for new words?

_____

_____

_____

Here are two future-related words for your dictionary:

NUCLEAR DYAD—Futuristic term for the childless husband and wife, as opposed to the nuclear family with offspring.

SANSAN—One of the names for the supercity which is slowly forming between San Francisco and San Diego.

NEWS ARTICLES FUTURE FILE

Use this file to collect and organize newspaper and magazine articles regarding science, technology, and future trends. Add two to five items per week. Fasten them on separate papers with notes to help you recall what you considered important when you clipped and saved them. Broad categories might be SCIENCE, TECHNOLOGY, and TRENDS. Index your notebook in at least ten general future-related headings such as those listed below.

Communications **Leisure** **Health**
Silicon chips **Education** **Life Extension**
Robotics **Medicine** **Values** **Work**

Suggestions for Additional Categories: Computers, Future Shock, Geriatrics, Expediencies; Boundaries in the Future; Cyborgs; Ecology and Conservation; Economics; Future Shock; Housing; Money; and Work. Use your own ideas and interests for topics also.

Creative Problem Solving

Brainstorming and the use of an evaluation grid are two procedures used by groups in solving problems. They are especially effective when used together.

BRAINSTORMING

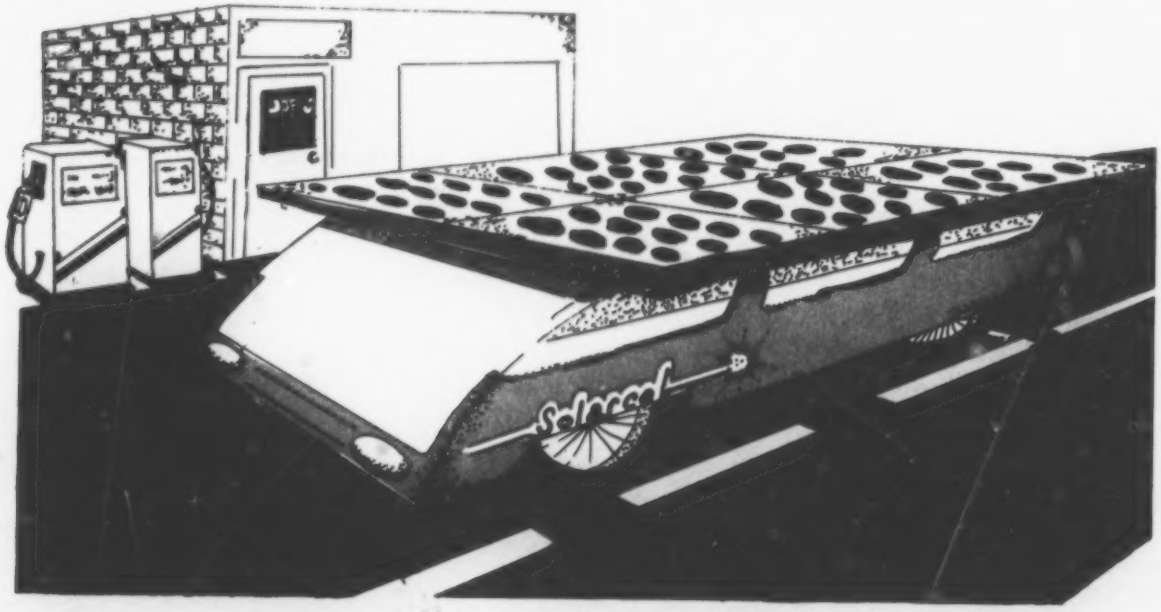
Add the action word *brainstorming* to your vocabulary. It is defined in *The New World Dictionary of the American Language* as "an unrestrained offering of ideas or suggestions by all members of a conference to seek solutions to problems."

To start the brainstorming process, a problem is written on the board. This could be the problem: HOW MIGHT WE KEEP THE SCHOOL GROUNDS CLEAN DURING THE LUNCH HOURS? Members of your group react to the problem and respond with suggestions for the solution. The suggestions are written on the board, and the students can "piggyback" on each other's ideas in order to produce new solutions.

All ideas in the brainstorming process are accepted without judgment by the group. No comments are criticized as newer ideas are often based on those already given by others. A free flow of ideas is important, and criticism will inhibit some of the students.

After all the solutions have been presented, they are discussed. Some of them can be combined and, eventually, they are ranked.

Brainstorming is an excellent technique to use when a great number of ideas are needed in a short time. Used in conjunction with the evaluation grid, it is a powerful tool that can be used to solve problems.



THE EVALUATION GRID

Examine the evaluation grid in the Reference Section of this book. This is one procedure used by groups to solve problems. A problem is identified and placed on the grid. Alternative solutions are suggested by group members, screened, and written on the grid. Five criteria are also identified and written in the designated spaces. Each member of the group then rates each of the solutions against each of the criteria.

Here is an example problem: HOW MIGHT WE REDUCE ACID RAIN? This problem is written on the grid and also on the board where all can see it. The group now proposes ten solutions. If more than ten are suggested, a vote is taken to determine the best ten.

The next task for your group is the selection of criteria which will help you determine the most appropriate solution. Five criteria are needed. As an example, the phrase WORTH THE COST might be selected as Criterion A. AVAILABILITY could be Criterion B. You class will need to determine all five criteria.

Your class can use brainstorming to arrive at both the alternative solutions and the criteria. When the class members have agreed, their choices for ten alternative solutions and five criteria should be entered on the evaluation grid.

STUDY and EVALUATE the suggested solutions under each of the five criteria. Copy the alternative solutions and the criteria on your own evaluation grid form. Rate the solutions against each of the criteria on a scale of one to ten with ten being the highest consideration. As much as possible, base your choices on data rather than on opinion alone. You might select under Criterion A a 6 for the first suggested solution and an 8 for the second. Rate all the alternate solutions under Criterion A before moving on to Criterion B. Criteria C, D, and E follow in turn.

When your own ratings are completed, compare them with those of another student. Work together until the two of you agree on the ratings. Then join with two other people and continue the agreement process. When agreement is reached, join with another group of four for comparisons, discussion, and eventual agreement. Some bartering and, of course, some compromising, will take place.

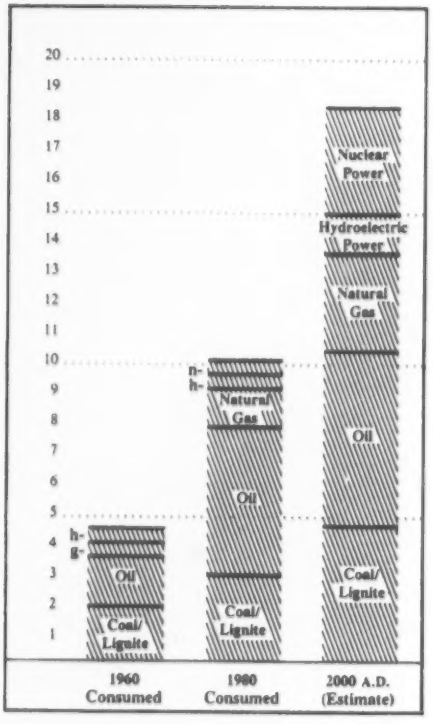
The best discussions and enthusiasm will take place after your class has grown into two or three large groups. There might be some heated discussions at this point as students present their arguments for their ratings. The group's last task is to arrive at a consensus, selecting the preferred solution.

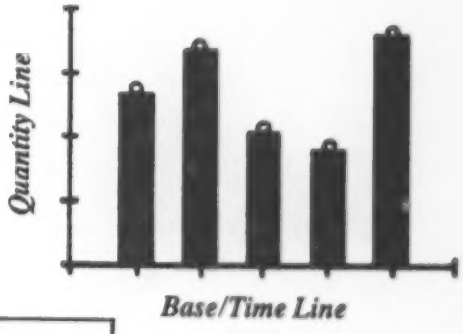
When all spaces under the criteria are completed, total each line. WHAT is the next logical step?

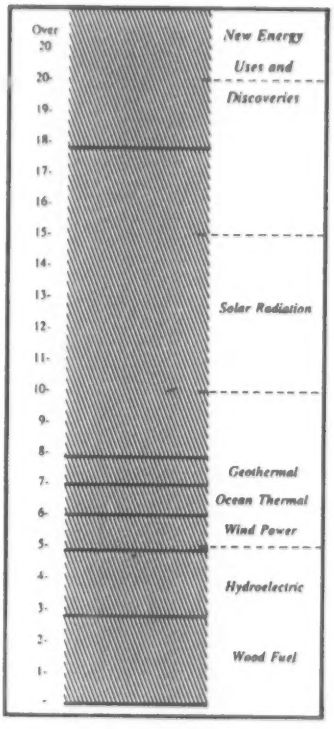
Analysis of the Problem-Solving Process: DESCRIBE your thoughts concerning this problem-solving procedure. Do you think this process is a succesful technique? Did you agree with the decision reached by the group? Can you think of other ways in which a group concensus can be reached?

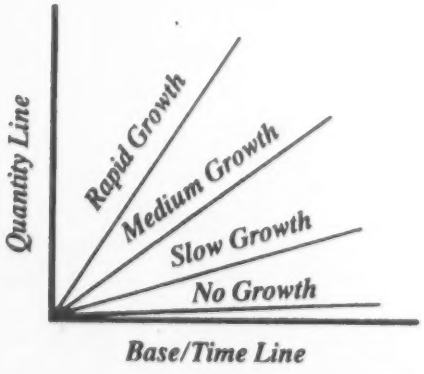
RESEARCH TECHNIQUES and PROCEDURES

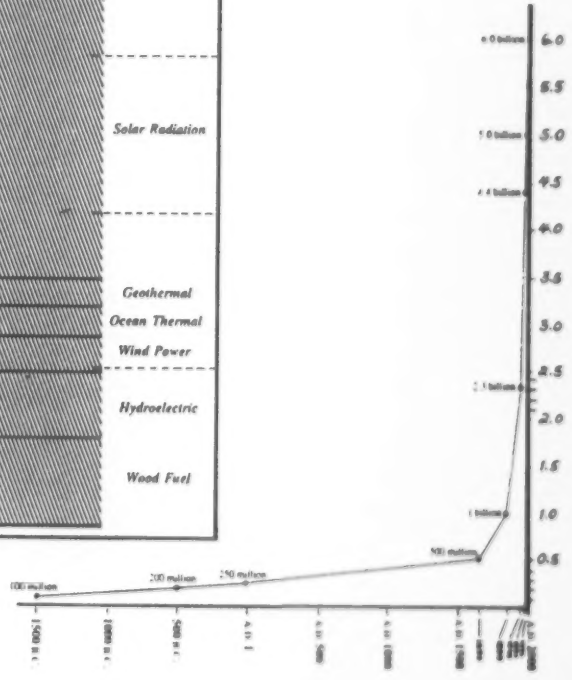
Teachers and Students as Futurist Researchers











BEST COPY AVAILABLE

Methods for Researching the Future

The projective techniques discussed in this book are but two of many used by futurists in researching into potential futures. They are the "Delphi Technique" and "Scenarios."

THE DELPHI TECHNIQUE

> Delphi is a small town of ancient Greece famous for its temples and sacred advisors to military leaders, people, and governments. Temple priests and priestesses breathed fumes rising from the earth and then interpreted the dreams they had as advice for the future or as predictions.

Modern Delphi techniques are more logical than those of ancient Greece. Modern researchers avoid fume-filled seers, but call on respondents, or people with future-related experiences, for their ideas about the future.

If you were a Delphi researcher, you would ask individual persons for their suggested solutions to real and potential future-related problems. You would collect their suggestions, categorize them into several statements, and return them to the original respondents. The respondents would select from your list those statements they considered to be the best solutions and return them to you.

You would eliminate the least-preferred responses from the original list and return the shorter list to the same respondents, asking them to determine their preferred responses from the new list and again return their selections to you. When you had the final responses, you would tally them to determine the most-preferred solution. You would then develop your report according to the findings of your last tally, focusing on the preferred solution. In many reports reference is made to other highly-ranked alternatives as well. Pertinent, supportive ideas and comments made by the respondents might also be included in your report.

As you move through the Delphi technique, follow the checklist on page 93 of the Reference Section. Note the suggested study ideas presented in that section. Your class might develop its own concerns for a Delphi project.

DELPHI TECHNIQUE RESEARCH ASSIGNMENT: CHOOSE a concern related to changes that could take place in your future. The following is an example:

> Population should increase in the area in which you live by about 25 to 35 percent by the year 2015 A.D. People in this area work, attend school, and/or shop in several communities nearby. Currently the transportation system is considered barely adequate to meet the current needs of the people living in the area. Describe the problem for your future and ask your selected respondents to make suggestions for solving or attempting to solve your future transportation problem.

Delphi studies are usually conducted through the postal system on a one-to-one basis with each respondent. Their responses, therefore, are not influenced by the other respondents. In this way, the researcher can receive the original ideas from each respondent. How will this benefit your Delphi study?

_____

_____

_____

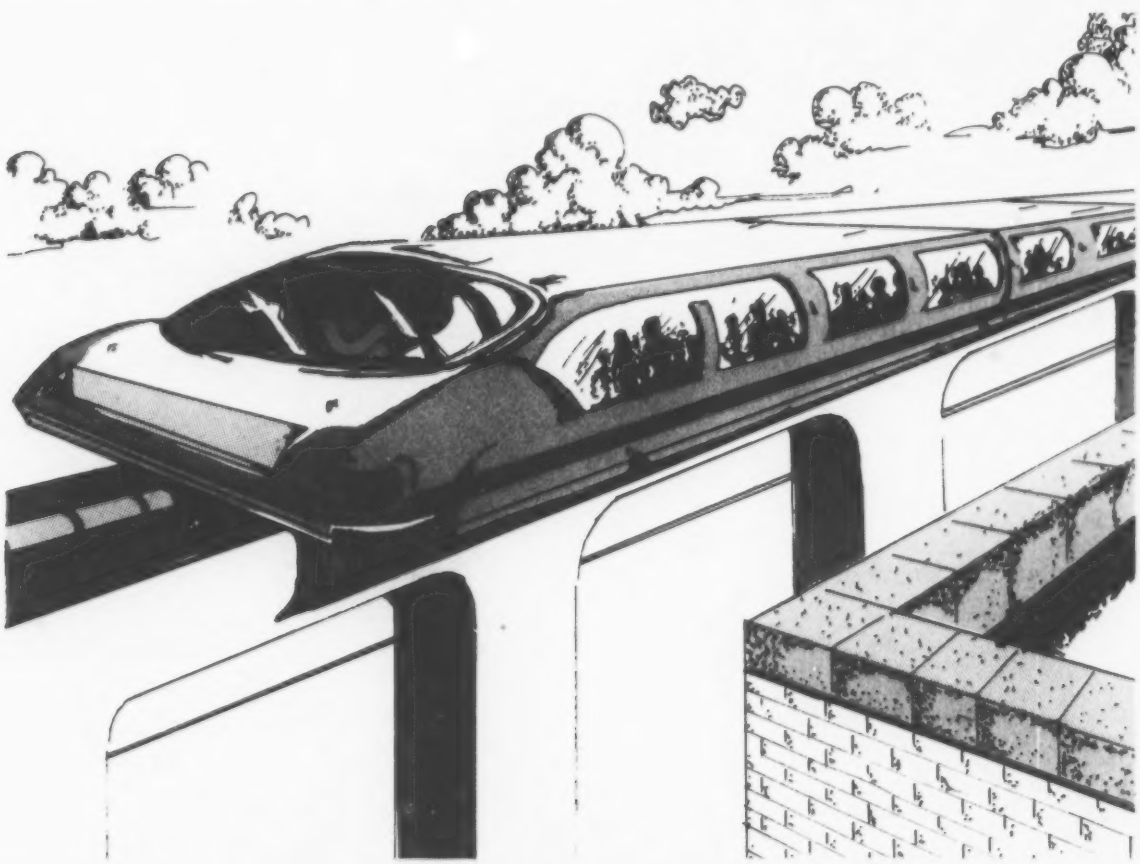
Due to time limitations in a class setting, members of your Delphi group might serve as "special mail carriers." They would deliver each round of questions to the repondents personally and pick up the responses on a subsequent visit. How would these "mail carriers" speed up your returns and, ultimately, your recommendations?

_____

_____

_____

Your respondents could include other students, teachers, family members, and neighbors. Do you know people who work in jobs related to your concern? Whom do you know that works in city government? Librarians might be helpful as both repondents and as resource persons.



The Delphi Technique Process

The Delphi process moves from many options or possible problem solutions through three rounds of opinionnaires to reach a single preferred option. Your group determines the problem and some questions needed to elicit several suggestions for solutions.

ROUND ONE: Mail or deliver your problem statement and instructions for reply to your selected respondents. Collect their responses and ideas. Categorize them into statements of possible solution. Make a list of the new statements.

ROUND TWO: Send the new list to your original respondents. Ask them to reply again, this time selecting the best solutions from the list. Collect and tally their replies. Eliminate the least-selected options. Make a new, shorter list of remaining options.

ROUND THREE: Send the shortened list to the respondents. Ask them to make a final, single choice. Collect and tally the replies. You will have the one preferred choice from the respondents.

Base your recommendations and your report on the suggestion most frequently selected by your respondents. Enhance your report by referring to comments made by your respondents.

YOUR CHECKLIST:

_____ DETERMINE your problem area.

_____

_____

_____ WRITE your statement of concern.

_____

_____

_____

_____

_____ WRITE your instructions to the respondents.

_____

_____

_____

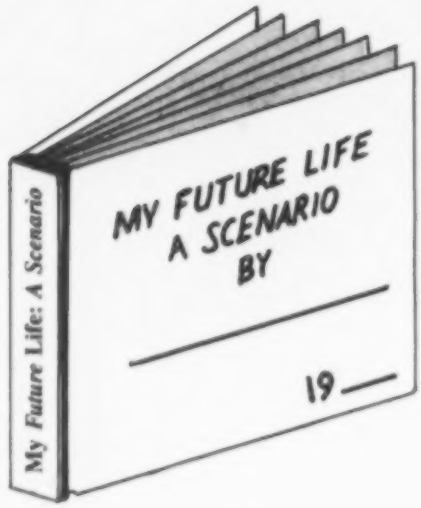
Number of responses: Round 1 _____ Round 2 _____ Round 3 _____

_____ WRITE your personal observations in your Future Journal.

Note: The Delphi technique, or method, is used when the researcher wants or needs a concensus opinion from several knowledgeable and experienced people. By using people with expertise or experience in future-related concerns as respondents, fewer respondents are needed than in a general survey. Findings in a Delphi study are usually aimed at possible future solutions.

SCENARIOS

Scenarios are stories that project logical sequences of events related to the future. Scenarios try to respond to concerns such as the following: What would happen in the future if a particular event occurred at this time? In government and commercial enterprises, scenarios are elaborately researched and prepared by staff specialists and researchers. Other scenarios are more simply written by one person or by small groups of writers. Your everyday thoughts about work and life in your own future contain many elements for your own scenario.



One kind of scenario begins in present time and projects into a special or specific future time. Many scenarios attempt to describe life in the 21st century. Think about the varieties of cars that might be available to you forty-two years from now. New sources of food, new medical technologies, new kinds of work, and new societies based on likely futures could be bases for scenarios describing events and lifestyles in your future.

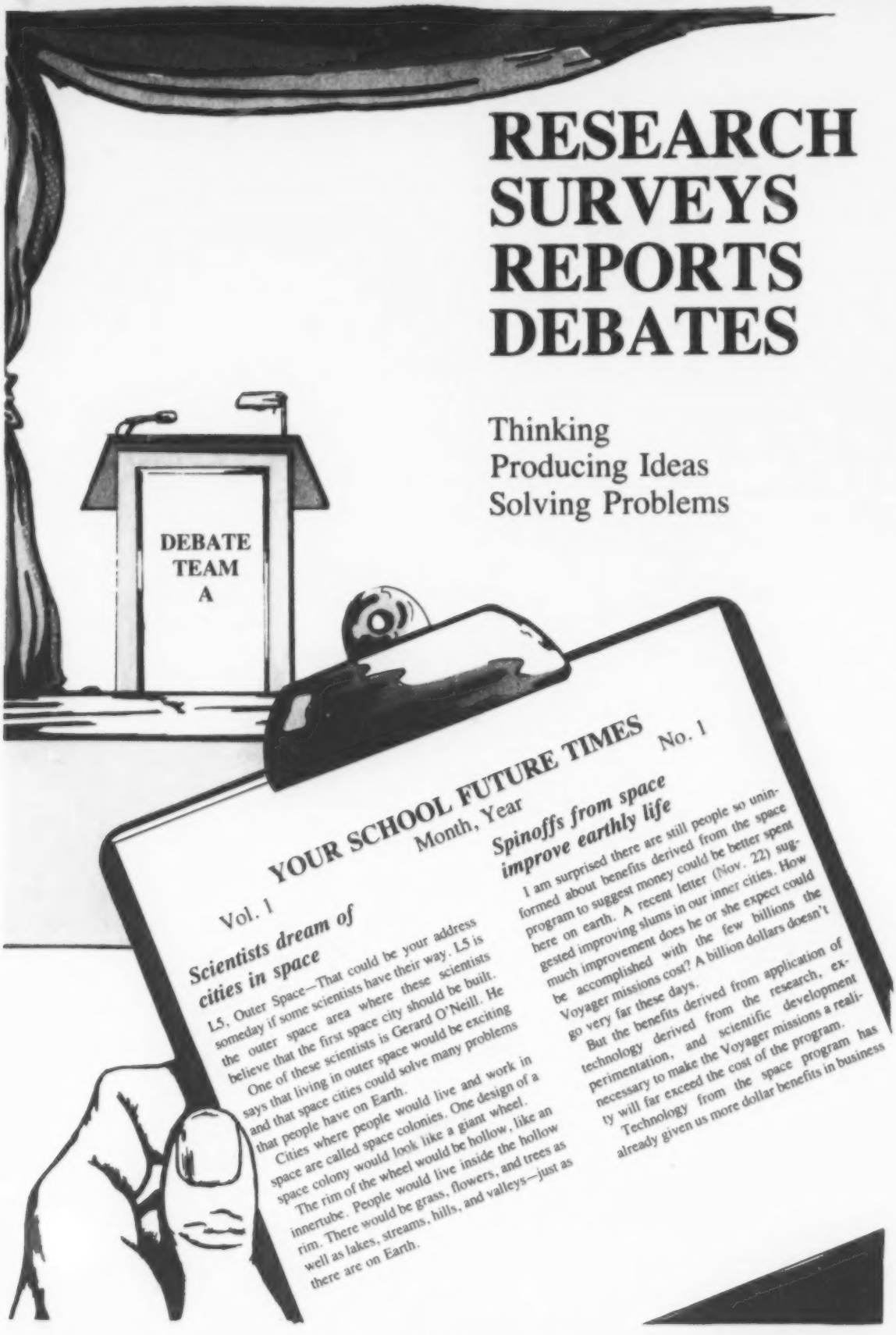
A second type of scenario places the writer(s) in a future society. Lifestyles, habitats, employment, and new customs are generally described in an introduction. This could be followed by an explanation of the historic events and changes that occurred in the years between the year in which the scenario is actually being written and the time in which it is allegedly being written.

Sequences in scenarios should be logical and possible. For example, the writer should not describe life in a space colony of 50,000 people if the largest space stations at the time of your story can support only 125 workers. Show, rather, a logical progression in space exploration and colonization. This might include a seven-person experimental station in 1999, a twelve-person observation satellite in 2005, and a thirty-person space manufacturing unit in 2010. Perhaps in 2012 a multi-purpose space village of 250 could be established. Each sequence in a scenario should build on previous ones.

SCENARIO ASSIGNMENT: WRITE your own scenario. You may either start from today and project events into the early 21st century or you may look back from your 21st century home at personal and social events that took place since you were a student in a 1990's class studying the future. Do not project too far ahead for this assignment, certainly not more than thirty years. You will be writing about a new and changing cultural and social time. Remember, in your scenario you may project ahead or you may look back from your future time and place.

RESEARCH SURVEYS REPORTS DEBATES

Thinking
Producing Ideas
Solving Problems


DEBATE
TEAM
A
YOUR SCHOOL FUTURE TIMES
Month, Year
No. 1
Vol. 1
Scientists dream of cities in space
L5, Outer Space—That could be your address someday if some scientists have their way. L5 is the outer space area where these scientists believe that the first space city should be built. One of these scientists is Gerard O'Neill. He says that living in outer space would be exciting and that space cities could solve many problems that people have on Earth.
Cities where people would live and work in space are called space colonies. One design of a space colony would look like a giant wheel. The rim of the wheel would be hollow, like an innertube. People would live inside the hollow rim. There would be grass, flowers, and trees as well as lakes, streams, hills, and valleys—just as there are on Earth.
Spinoffs from space improve earthly life
I am surprised there are still people so uninformed about benefits derived from the space program to suggest money could be better spent here on earth. A recent letter (Nov. 22) suggested improving slums in our inner cities. How much improvement does he or she expect could be accomplished with the few billions the Voyager missions cost? A billion dollars doesn't go very far these days.
But the benefits derived from application of technology derived from the research, experimentation, and scientific development necessary to make the Voyager missions a reality will far exceed the cost of the program.
Technology from the space program has already given us more dollar benefits in business

Research Products

Your future-related research can be submitted to your teacher or presented to the class in various forms, or products. Some of these products are more interesting than others. You might, for example, prefer delivering a presidential campaign speech to the class to writing a three- or four-page report. Or you might prefer debating to writing a book report. Select the product that you think will be interesting and that fits the research. On the following pages, several types of products are described.

SURVEYS

A research survey is an examination of a concern using the viewpoints of many people. The same question or set of questions is presented to individuals. Their responses/opinions are tabulated and become the basis for your report.

In your first survey, start with a few simple questions and talk with people that you already know. It is important to record their responses accurately. Tabulate and report your findings to the class.

The following are examples of questions used in surveys:

1. YES-NO QUESTION: Do you believe that the value systems of the 1990's are better, the same as, or worse than those of the 1940's?
2. MULTIPLE-CHOICE QUESTION: What will be the primary power source of the future?
   a. fusion
   b. fission
   c. coal
   d. nuclear
   e. solar
   f. other
3. OPEN-ENDED QUESTION: In twenty years, the most profound changes in our society will be

   _____

   _____

As your survey questions and techniques improve, you might take your work into other areas of the community, such as a shopping center or the library. Consult with your teacher, however, before you attempt a community survey.

DEBATES

Debates are formal arguments. The affirmative side supports a statement, known as the PROPOSITION, and the negative side opposes it. Here is an example of a proposition: THE GOVERNMENT SHOULD PROVIDE FREE HEALTH CARE FOR EVERYONE.

The following are the three phases in this modified debate form:

PHASE ONE: Each of the three members of each side presents a 2½–4 minute speech. A member of the affirmative team speaks first, followed by a member of the negative team. Teams alternate in this fashion. Each speaker has a role: the first speaker for each team provides an introduction; the second contributes supporting views and information; and the third develops a summary.

PHASE TWO: All six debaters present one-minute rebuttals, analyzing the weaknesses of the opponents' opening statements. This time the negative team speaks first. Again the teams alternate.

PHASE THREE: Class members submit questions to the debaters.

Each member of the class is a judge, awarding points on a 0 to 10 basis to each debater in each phase. There will be nine scores for each team. A member of the class can collect the team scores, total them, and announce the winner.

The key to a successful debate is the proposition. It should argue for a change in existing conditions and it should not be concerned with opinions. For example, "ABRAHAM LINCOLN WAS A BETTER MAN THAN GEORGE WASHINGTON" is not a good debate proposition.

ORAL REPORTS

You should make an effort to present at least one oral report to the class relating to a future studies topic. Careful outlining and diligent research are necessary ingredients, but there are other factors to consider as well. Refer to this checklist as you prepare for your oral report.

1. Is my material organized logically?
2. Will the additional material (charts, maps, posters, models, drawings, etc.) that I present help or hinder the report?
3. Will I maintain eye contact with the audience?
4. Will I have poise and use an acceptable vocabulary?
5. Will I enunciate properly?
6. Will I be prepared for the question-and-answer phase?

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PRESIDENTIAL CAMPAIGN SPEECH

Several members of the class assume the role of presidential hopeful and present campaign speeches. After the last speaker has finished, the class votes and elects a "President of the United States."

This activity provides an excellent opportunity for people to combine their research with their forecasts for this country's future. One of the speakers, for example, wishes to concentrate on the problem of energy. Knowing that dozens of nuclear power plants have shut down recently, what position will this candidate take? Here are two options:

1. "If I am elected President of the United States, I will make every effort to reopen all the nuclear power plants that have closed in the past few years. I am convinced that nuclear power is the power of the future."
2. "I am aware that dozens of nuclear power plants are no longer open. They have become too costly, and it is time we discovered new power sources. If I am elected President, I will divert additional millions of dollars into the development of fusion as a power source."

Two different approaches. Which option, if selected by the speaker, will pave the way to the White House?

THINKING-SKILL VERBS

Locate the listings of thinking-skill (process) verbs in the Reference Section. Examine the lists and their headings. Do you see how these verbs, if placed in questions, could elicit different knowledge processes?

DEVELOP a question using a verb from LIST I:

_____

_____

DEVELOP a question using a verb from LIST VI:

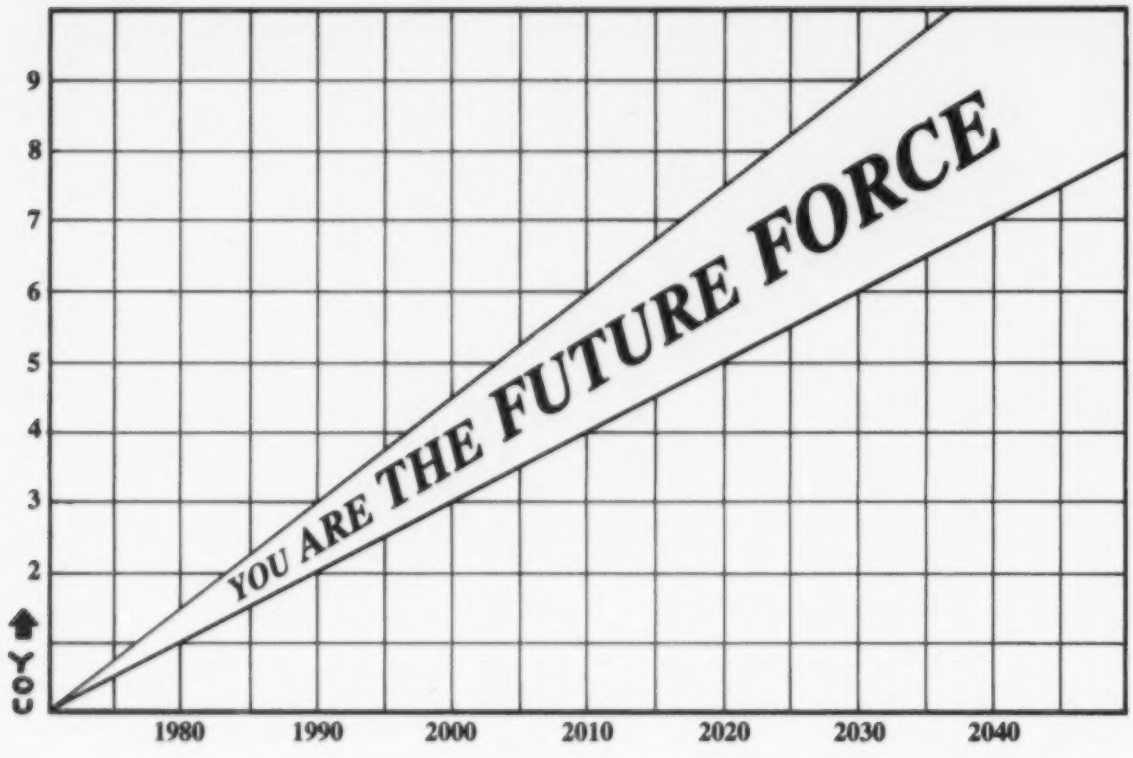
_____

_____

IN WHAT WAY does your first question differ from your second?

_____

_____



FUTURE AWARENESS

YOUR introduction to the study units

Future Awareness Test

ARE THESE CONCERNS A PART OF YOUR FUTURE?

Write "True" or "False" before each statement. Base your choices on your present understanding of changes that might occur in your 21st-century world.

_____ 1. In the new century, DNA technology will help doctors identify diseases related to genetics.

_____ 2. NASA will select and train future astronauts on a regular, continuing basis.

_____ 3. New electronic technologies will enhance capabilities for 21st-century law enforcement agencies to use options other than prison for punishment of lawbreakers.

_____ 4. Future urban planners will need to recognize that more people will live in the world's earthquake-prone areas.

_____ 5. The most rapidly growing type of future American family in the next 25 years will be step-families.

_____ 6. Astronaut, space physician, exobiologist, selentologist, space-launch director, payload specialist and space welder are all examples of future space-industry jobs.

_____ 7. Millions of people alive in 1990 will still be living in 2075.

_____ 8. By the start of the 21st century, Chinese pigs bred with American pigs will produce larger litters with leaner pork.

_____ 9. The World Health Organization can eradicate polio by the year 2025.

_____ 10. By 2015, 75% of all companies in the United States will have developed a code of ethics for their employees, and 35% of those companies will provide ethics training by that date.

_____ 11. Within the next twenty years, people will be able to buy medicines from drug store shelves that presently are available only through prescription.

_____ 12. Some people with the HIV infection do not develop AIDS, but they can transmit AIDS to others. According to United Nations projections, the number of HIV-infected women in the world will surpass the number of HIV-infected men by the year 2005.

_____ 13. Laser procedures have been used by doctors in over a million medical and surgical procedures for the past ten years. In the next twenty-five years these procedures will increase dramatically.

_____ 14. Heart, kidney and liver transplants have developed into standard medical procedures. By 2020 transplants of fingers, toes and limbs will also be commonplace.

_____ 15. Twenty-first-century museums will hire thousands of design specialists to create facilities that will demonstrate scientific and technological advances.

Note: See page 37 for the answers to this test.

It's Your Future

YOUR future will be different from any other, ever. In times past, children grew up with the values, work ethics, lifestyles, religious beliefs, and attitudes of their parents. Communication was slower, travel was limited, and values and responsibilities were clear-cut and understood. Life was more predictable.

That past time is gone. Technology has brought rapid change— so rapid, in fact, that people have not been able to adjust to it. In your future, you can anticipate even more changes.

Change has always been a part of life, but never in history has change taken place so fast. Your world has already changed greatly and will continue to change in your future. Computers, space exploration, communication satellites, human-body transplants, nuclear and solar energy research, and the information explosion are some of the forces that will cause even more change.

Change, therefore, will be a part of your future. Most of it will be rapid. Many products that you will use in your future will be considered technologically obsolete while they are still new. You will be able to use them, but more advanced versions of the same product will already be on the market. That kind of change might be illustrated with automobiles. Cars that can talk to the driver about safety conditions, maintenance needs, and fuel supply have taken the place of autos in which the drivers had to remember to check and take care of all the needs. Today's cars will someday be replaced by cars which will be able to respond to voice directions.

This is a hint of your future. One concern underlying ***Future Options Unlimited*** is that you who will live in that future should have opportunity to participate in the planning for that time. The workbook activities are designed to acquaint you with the importance of future-related study. It is YOUR FUTURE!

How do you become an active futurist? Do you need to join an organization to be a futurist? HOW will research and study help you influence the future? If you were asked to describe future concepts to younger children, WHY might you use the word "tomorrow" to help you explain the future?

It is your future! What are your ideas about it?

A WRITING BLITZ: The 21st Century

Your teacher will conduct a writing blitz. In a five-minute period, you will list several one-sentence ideas about the future when you will be adults, parents, teachers, and decision-makers for others. Write down only your own personal thoughts. Will your tomorrows be better or worse than the present? Will the kinds of work you like be available to you twenty-five years from now? Will your housing and transportation be the same in fifty years? In what ways will your eating habits change? Your teacher will give the signal to begin and the one to stop. On a separate sheet of paper write down as many ideas as you can in your five-minute blitz.

All papers will be collected and read to the class. Ideas stated will be listed on the chalkboard for discussion. Add new ideas to your paper when you get it back. Keep it in your journal for reference.

From the writing blitz, class discussion, and other information that you have, WRITE your ideas about the importance of studying the future now. HOW can study about future ideas at this time help you prepare for living in your own future? On the same paper, DESCRIBE why you are a logical person to be a futurist. Your teacher will read your paper and return it to you for your journal.

Try your hand at cartooning. In the box below, draw a humorous picture of yourself working, playing, or studying for a new job in 2047.

The 21st century is YOUR future!

Note: All answers to the Future Awareness Test are true.

Student Introduction to the Study Units

Studying about the future is exciting and fun. It is also practical. When you are studying possible and probable futures, you are looking at aspects of your own tomorrows. By examining alternatives to concerns, you develop more flexibility in your responses to future events. A most important aspect of your research is the interest you bring with you.

Keep in mind that the reports and research you produce will stay with you and might be expanded in other classes. Complete your assignments one at a time. You will feel a strong sense of accomplishment and will gain basic information that will help you in your own and future planning.

Each study unit is organized into thirteen related activities:

1. The INTRODUCTION to each unit is a series of questions related to a major topic. ANSWER as many as you can. Some are for all students. The middle group is for individual student response and the final questions are for group activities. ADD your questions to reflect your own concerns. Keep your responses and questions for discussions and as a resource for yourself.

2. DEFINE the words in the Words to Know Section. Add them to your dictionary.

3. READ the NEWSPAPER ARTICLES in each unit. Check with your teacher about bringing current news items to class for discussion and projects.

4. REPLICATE the Reaction to the Articles form on page 102. DESCRIBE your ideas based on what you read in the news items.

5. BE a famous FORECASTER for a day. DESCRIBE what you see as major concerns twenty-five (25) and fifty (50) years into the future, based on your reactions to the news articles. See the Forecasts form on page 103 for more help.

6. Use a copy of the practice graph on page 101 to show your projections in a graphic form. The time-line marks need zero, twenty-five, and fifty years. Enter figures on the graph of something related to your forecasts at each date.

7. SELECT a topic related to your study unit for your research activity. Refer again to the questions at the start of the unit. Use those questions to help you select a topic.

8. DEVELOP your project. Refer to pages 94-96 in the Reference Section for project ideas and for suggestions about organizing your work.

9. WRITE your report. PRESENT your written report to your teacher and/or an oral report to your class. Remember to give your teacher a written courtesy copy of your oral report before your class presentation. For oral reports, the students in the audience will evaluate the materials being presented, the use of terminology, and the poise and knowledge of the presenter. Check the ideas that were discussed on page 32 for evaluating oral reports.

10. Use the information you have gained to complete special activities, such as debates, surveys, class newspapers, and story writing.

11. Present the results of your special activities to your class. Use audio and visual materials that you have developed.

12. Use the Personal Assessment Sheet on page 106 to ASSESS your own involvement in the future. From information you have gained in your work unit, describe your ideas and concepts that have changed since you started your study of the future.

13. This is a class activity in group PROBLEM SOLVING. Select a problem related to the study unit topic and use an evaluation grid to read a solution. See the sample Evaluation Grid on page 107. Conduct discussions involving the whole class to determine the basic problem to be solved, some alternate suggested solutions, and some criteria for judging the suggested solutions. The full procedure is described in your workbook on pages 23 and 24.

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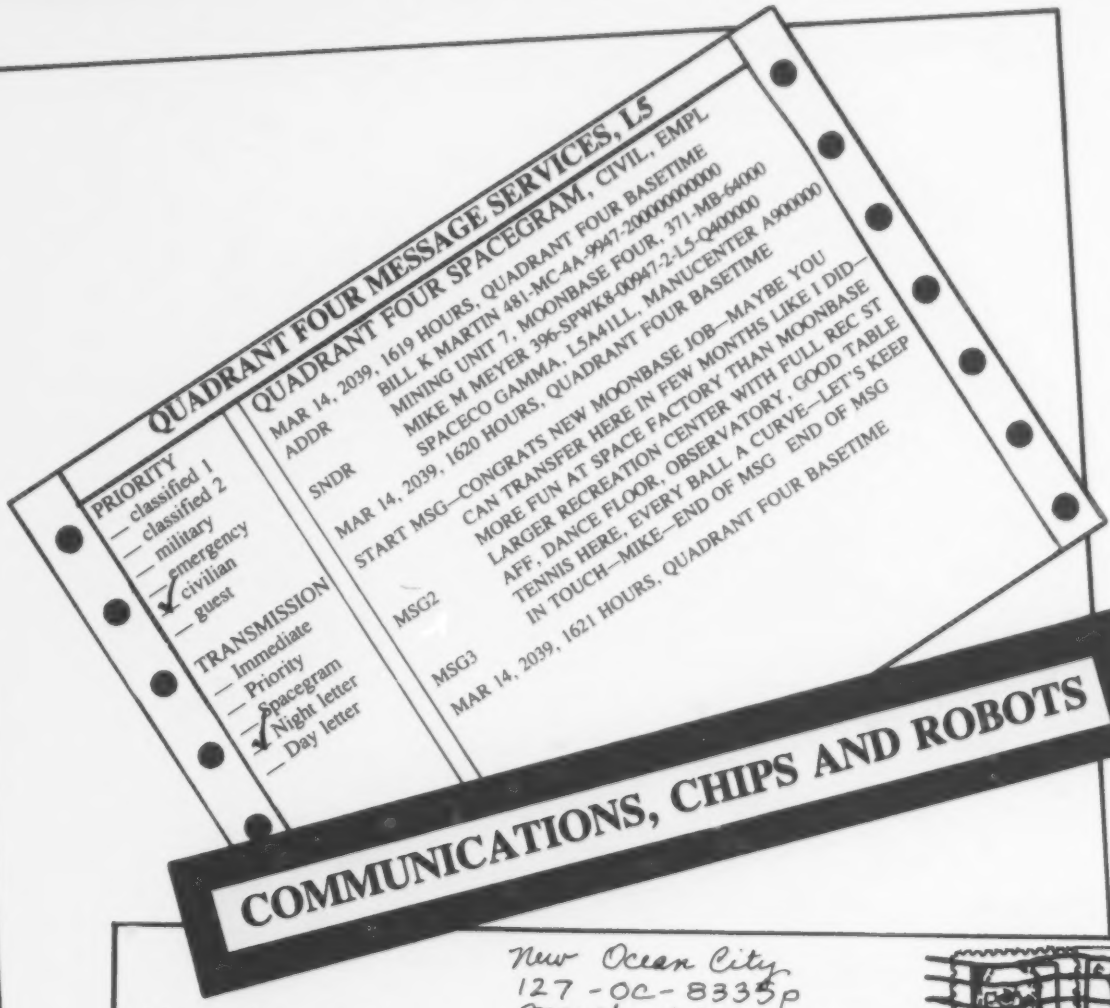

QUADRANT FOUR MESSAGE SERVICES, L5
PRIORITY
— classified 1
— classified 2
— military
— emergency
✓ civilian
— guest
TRANSMISSION
— Immediate
— Priority
— Spacegram
✓ Night letter
— Day letter
QUADRANT FOUR SPACEGRAM, CIVIL, EMPL
ADDR MAR 14, 2039, 1619 HOURS, QUADRANT FOUR BASETIME
BILL K MARTIN 481-MC-4A-9947-200000000000
MINING UNIT 7, MOONBASE FOUR, 371-MB-64000
SNDR MIKE M MEYER 396-SPWK8-00947-2-L5-Q400000
SPACECO GAMMA, L5A41LL, MANUCENTER A900000
MAR 14, 2039, 1620 HOURS, QUADRANT FOUR BASETIME
START MSG—CONGRATS NEW MOONBASE JOB—MAYBE YOU
CAN TRANSFER HERE IN FEW MONTHS LIKE I DID—
MORE FUN AT SPACE FACTORY THAN MOONBASE
LARGER RECREATION CENTER WITH FULL REC ST
MSG2 AFF, DANCE FLOOR, OBSERVATORY, GOOD TABLE
TENNIS HERE, EVERY BALL A CURVE—LET'S KEEP
IN TOUCH—MIKE—END OF MSG END OF MSG
MSG3 MAR 14, 2039, 1621 HOURS, QUADRANT FOUR BASETIME

COMMUNICATIONS, CHIPS AND ROBOTS

New Ocean City
127-OC-8335p
March 14, 2039

Dear Grandma,

I need another vacation. Tell Gramps I'll be there for his retirement shindig. How did he manage to get 58 years in with only four different jobs? I'm on my fourth one already and am studying for my fifth. I want to be prepared for the time when they phase this one out from under me too.

Maybe you and Gramps would like to visit me here on the ocean. I think I could arrange it.

Hope to see you soon,

Don

Mr. & Mrs. H. Morgan
4891 Longaway St.
Chicago Hills, USA
333-USA-5327-41

Communications, Chips and Robots
Introductory Questions

The world is experiencing several technological revolutions, all interrelated and all taking place simultaneously. Scientists believe that robots will soon be used to manufacture and repair other robots. *The Omni Future Almanac* forecasted almost 25,000,000 robots at the beginning of the 21st century: 11,000,000 in Japan; 7,500,000 in the United States; and 5,600,000 in the USSR.

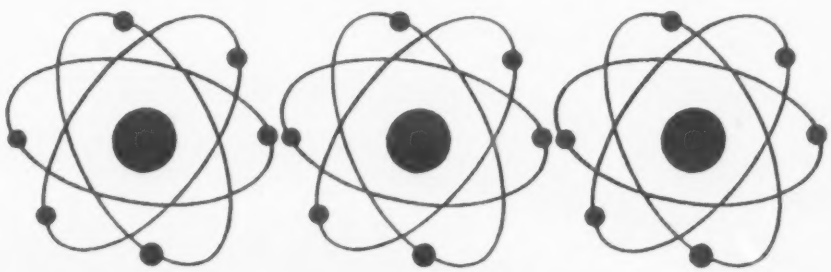
Japan has taken the world leadership in the "Robot Revolution" by installing thousands in its factories, more than all the rest of the industrialized countries together. Japan has built the first factory in the world where robots assemble other robots.

Related to the robotic revolution is the telecommunications revolution, which has been accelerated by the development of fiber optics. A bundle of glass wires about the size of a finger can carry 240,000 telephone conversations at one time.

Still another technological revolution has occurred with the development of the silicon chip, providing one of the most important advances in the communications field. In 1984 IBM Corporation announced that it had developed a chip that could store at least one million bits of information—the equivalent of a 400-page novel and four times more than any other available chip. What's more, a 16-million-bit chip recently made its appearance. In the near future supercomputers will be capable of making a trillion calculations per second.

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop a project based on three to five GROUP PROJECT QUESTIONS. All members of the group should participate in either a written or an oral report.



INFORMATION QUESTIONS

Write your answers to these questions on a separate sheet of paper for your journal.

1. Would you like to be able to see the person with whom you are having a phone conversation? Why or why not? Can you see some disadvantages in a situation where you could see the other person during a phone conversation?

2. "Silicon Valley" is a nickname for a concentration of industries based on the silicon chip. Can you identify any areas with that designation? (HINT: There are at least five states with Silicon Valleys. California is one.)

3. R2-D2, the robot from the *Star Wars* films, is a robotdroid. Define "robotdroid."

4. Some young people have built robot pets, such as turtles and dogs. What pet would you build as a robot? Why? You might want to read the book *Do Androids Dream of Electric Sheep?* by Philip Dick. It is a science fiction novel featuring robot pets. The book is listed in the Recommended Further Reading section of this book.

5. Computers can challenge the best chess players in the world. Would you prefer another person or a computer as a chess opponent? Why?

INDIVIDUAL ACTIVITY QUESTIONS

Use separate sheets of paper for your answers to the questions you select. Place them in your journal for reference, for help on other reports, and for class discussion.

6. Robots are used primarily in industrial situations today, but some companies are manufacturing robots for use in the home. Would you consider purchasing one? What tasks do you think a robot should perform in the home?

7. Why is silicon used to make the transistors in computers? (HINT: See your glossary.)

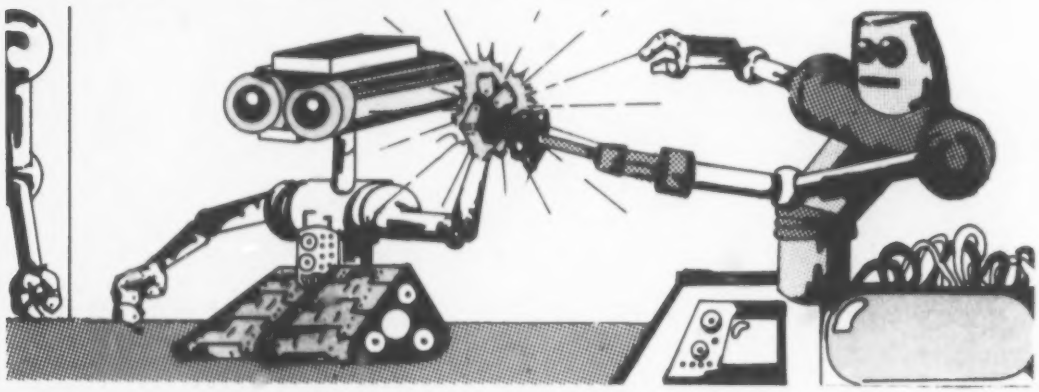
8. How can computers be used to train athletes?

9. Charles Babbage is considered "the father of the computer" because his work inspired many computer inventors. Develop a report about computers and present it to the class. Highlight Babbage's "super calculator" and his analytical engine. Demonstrate the relationship between his work and the development of modern computers.

10. Computers may be used by people who have control only of their eyes or toes or eyebrows. Computer chips, implanted in the brains of blind people, allow them to see. Johns Hopkins University has developed a computer which is controlled by a person's chin. Your report will focus on the aid that computers can provide to the handicapped.

GROUP PROJECT QUESTIONS

Responses to the first ten questions might be included for use with the group projects.



11. Write to a friend relating your experiences last week on your space colony. You might recount activities related to your directional control computer, which keeps the space colony solar receptors facing the sun. Or you might describe a day at school or at a picnic in Jupiter Park. Add 40 to 60 years to the date of your letter. Use the letter of the Quadrant Four message on page 40 for ideas.

12. Locate a business that has engaged in teleconferencing. Ask a representative of the company to describe the teleconferencing procedure. One source is the telephone company in your area. Also ask companies to send you brochures and other materials for your class presentation.

13. Although robots will replace many workers, many futurists believe that there will be more jobs after robots appear on the scene. How can this occur?

14. What are some new careers that will be created in the 21st century based on new technologies such as robotics, telecommunications, fiber optics, and the silicon chip/computer explosion.

15. Automobile manufacturers in the United States are developing assembly lines that use the combined services of humans, robots, and computers. Develop a report that shows how these new assembly lines will operate and present it to the class.

16. Will the Age of the Robot be a progressive step forward in the history of humankind? Or will it be a step backward? Select one of these positions and develop a research report.

17. The tiny computer-on-a-chip has been called the "miracle chip" and it will have an impact on our lives in thousands of ways. List the new jobs that the miracle chips will perform in the future.

18. Write to a company (you choose the company name) that produces robots. Ask for materials such as pictures, posters, schematics, or any type of literature that relates to robots. When you report to the class, display the materials sent to you. Check the BIBLIOGRAPHY in the Reference Section for resources relating to robots.

Communications, Chips and Robots
Words to Know

The words that follow are important because they relate to Communications, Silicon Chips, and Robots. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. android: _____

_____

2. binary system: _____

_____

3. computerized voice machine: _____

_____

4. cottage industry: _____

_____

5. electronic watchdog: _____

_____

6. fiber optics: _____

_____

7. robomation: _____

_____

8. robotics _____

_____

9. silicon chip: _____

_____

10. smart machine: _____

_____

11. telecommunications: _____

_____

12. teraflop: _____

_____

Communications, Chips and Robots
News Articles

The first article compares the Rosetta Stone, which provided the key to ancient hieroglyphics, to modern-day computers, which have redefined communication between peoples of the world. As the Rosetta Stone reached into the past, the computer reaches into your future.

The new hieroglyphics

It is not a stone this time, but wires and plastic blips of light. We didn't discover it. We're not using it to decipher an ancient culture. We are building it to understand each other.

Quite a tool, this new Rosetta Stone. The personal computer has it all—even sound in an increasing number of cases. Can't write a letter? Draw it. Or even say it. Then send it off to your friends.

But these machines do more than expand communications. They are changing the way we communicate.

(Excerpted from the *Christian Science Monitor*, March 20, 1991.)

One study has shown that some writing-class students used shorter sentences when they composed with computers. Would that be an advantage to you? Or should literary style always be more important than a machine?

Communicating with other people is an important part of our lives. WRITE in your journal your ideas relating to the computer's role in changing relationships in communication.

The robot in the article at the right acts as a home sentry. Read the article and RESPOND in your journal to the questions in this and the next paragraph. What other robots would you want in your home? What tasks would you have them perform?

The Statistical Abstract of the United States 1990 shows robot sales at 5,466 in 1985; 6,037 in 1987; and 4,557 in 1988. Do you think this means that robots will assume greater roles in your future? What kinds of tasks will robots perform in your future? How might the presence of robots reduce the humanness in your future personal relations?

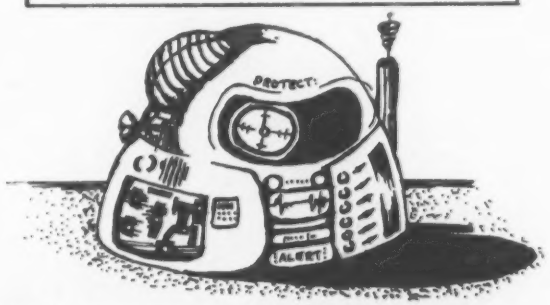
Robot sentry

Scout-About robot is an electronic watchdog.

It moves around the house to find a strategic place to sit and watches for intruders. If anything moves within a 30-foot radius, the 2-foot-high, dome-shaped robot sends a silent alarm signal to local authorities through phone lines.

It's equipped with motion detectors and heat sensors and can hear shattering glass up to 150 feet away. Less than one thousand dollars; due out in February 1992.

(Excerpted from *USA Today*, July 6, 1991.)



A famous science-fiction writer, Philip Dick, created a story world where pets were robots. Would you like a robot dog or cat? Would you like a robot cow? Why? Why not? Do you know others who believe that robots can only be toys? WRITE the answers to these questions in your journal.

The computer industry has a new word, *teraflop*. WRITE *teraflop* in your Futurist Dictionary. Information in the next news item will help you with the definition.

Supercomputers perform a trillion mathematical calculations a second! What a staggering thought for your future. According to the article, the term *teraflop* comes from the Greek *teras*, which means one trillion, and FLOP, an acronym used by computer engineers for floating point operations per second.

The advent of supercomputers has developed information which is also helpful to operators of smaller business and personal computers. What kinds of multiple uses will you want for your next computer? WRITE your answers in your Futurist Journal.

Supercomputing's speed quest
Trillion calculations a second is the goal

In the computer world, it is known as the race for the teraflop. The goal is to design a computer that is more than a 1,000 times faster than the most potent current models—a supercomputer capable of running more than a trillion mathematical calculations each second.

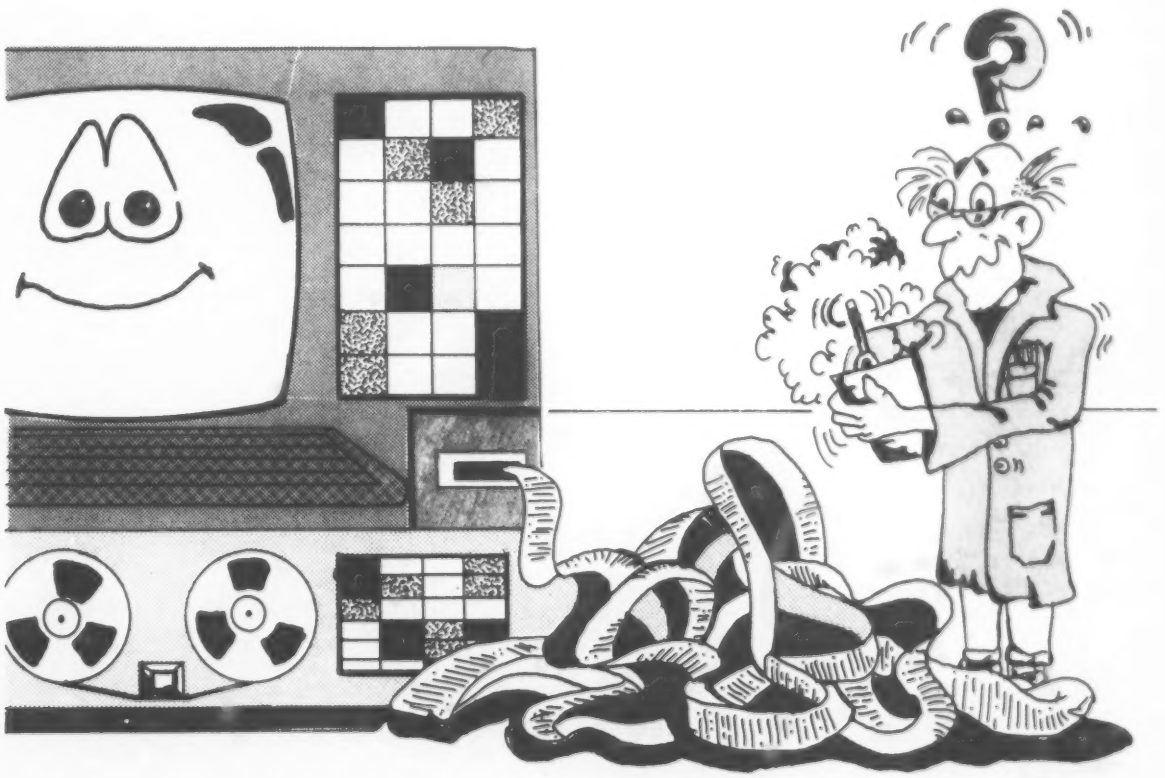
Computers are already almost doubling in speed every three years, allowing users to tackle problems they could only dream about before.

Supercomputers are envisioned as the scientific workhorses of the next century for physicists, astronomers and other scientists to research scientific projects ranging from mapping the surface of the planets to designing new computers to simulating neural networks, the mechanisms of biological brains.

A single teraflop supercomputer will need a staggering number of memory chips—more than what is currently found in a million personal computers.

(Excerpted from *The New York Times*, May 31, 1991.)

Many computer businesses have representatives who make presentations in schools. Invite a representative to your class to explain the tremendous qualitative leaps that have been made in computer design and productivity. TAKE NOTES in your journal as the speaker describes the changes.



Communications, Chips, and Robots
Study Unit

PHASE I: Reaction to the Articles

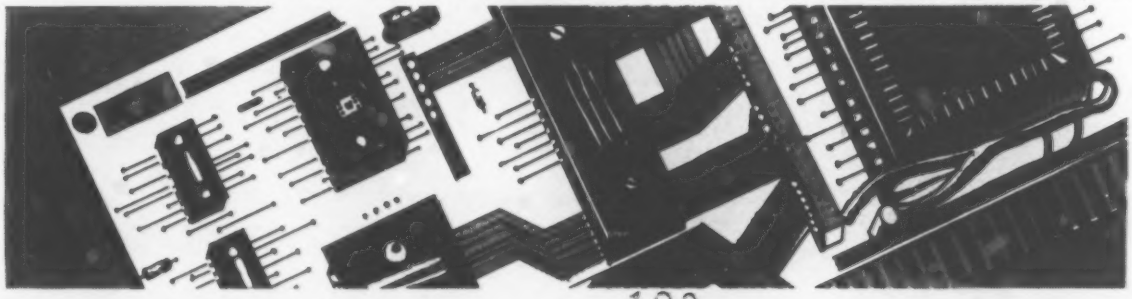
Examine the articles and clippings in your file entitled "Communications, Chips and Robots" and the files in the CLASS LIBRARY of future-related items. Respond to the questions below in addition to those on the Reaction to the Articles form found on page 102 of the Reference Section. Your teacher will either provide copies of this form or ask you to copy it. Place your reactions in your notebook.

1. The supervisor informs you that your services are no longer needed because a robot will assume your duties. What would be your reaction?
2. Would you prefer an electronic newspaper (information screen) or a newspaper printed on paper and delivered to your door? Why?
3. Select three articles dealing with robotics and summarize the significant facts.
4. Which of the articles (either in your files or in the class's files) dealing with the silicon chip is most interesting? Why?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the Forecasts form on page 103 in your Reference Section. Your teacher will provide copies of this form or ask you to copy it. Use it as a guide as you make your forecasts about the future of Communications, Chips, and Robots. Forecasting the future is usually based on past happenings and present-day research.

1. Based on your responses to the articles and questions, what are your forecasts for the COMMUNICATIONS industry? For the SILICON CHIP? For ROBOTICS?
2. **According to the** *World Almanac* and *Book of Facts 1991*, 98% of the households in the United States—92,100,000 homes—have television sets. Of those, 90,100,000 have color sets; 2,000,000 have black-and-white ones; and 59,865,000 of them have more than one set. Cable television has made a remarkable gain and now reaches 53,970,000 homes—more than half of those homes with television sets! What ideas do you have about the growth of cable television and the future of television in the United States?
3. Which three articles have provided the most forecast material? How have they helped you?



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PHASE II-B: Alternative Futures for Life in the 21st Century as a Result of Advances in Communications, Chips, and Robots

Use the Alternative Futures form on page 104 in your Reference Section as a guide as you construct a future which must absorb the impact of your forecasts. Your teacher will either provide copies of the form or ask you to copy it.

1. How will humans be affected if robots perform all the manual labor as well as all assembly-line tasks?
2. What changes will occur in education if computer-assisted instruction (CAI) would allow students to remain at home?
3. What type of society do you foresee in which people might wear computers on their wrists?

PHASE III-A: Your Area of Individual and Group Research

Use the Research/Report Outline form on page 105 in your Reference Section. Your teacher will provide copies of the form or ask you to copy it. This form will be used as the top page of your report. Your teacher can use it as a guideline for evaluating your report. You may wish to review the material on Focus Questions on page 7.

LIST your interests in telecommunications and robotics on a separate paper. Refer to the Introductory Questions at the beginning of this unit. These questions can be a starting point for your area of research. REWORK the Introductory Questions and your interests into one or two Focus Questions for your investigation. The following is an example of a focus question: HOW WILL I BE AFFECTED BY THE TELECOMMUNICATIONS EXPLOSION?

On the Outline form, fill in the TOPIC and one or two FOCUS QUESTIONS. Under PLANNED RESOURCES, indicate which of these materials you expect to use in your report. The ORGANIZATION section is a modified outline for your report:

1. **Introductory Statement:** Why did you select the topic? How do you plan to go about answering the focus question(s)?
2. **Resource Summary:** How will you use the resources you have selected? Where will you find the resources? If you plan an oral report, will you use any audio or visual aids?
3. **Concluding Statement:** What has been the result of your research? What conclusions will you present to the class or to the teacher? Did you expect these conclusions when you formulated your research design?

TITLE OF REPORT: _____

DATE OF REPORT: _____

Note: These are written reports, but, in addition, some of you will be selected to present oral reports as well. Six of you may be excused from this activity if you are members of the two debate teams.

PHASE III-B: Debate

Choose teams of either two or three students to represent the AFFIRMATIVE and NEGATIVE positions. (See page 32 for the Debate Procedure.) Here are some suggested debate topics:

1. RESOLVED: Robots should never exceed 10 percent of the work force in the United States.
2. RESOLVED: Computer-assisted instruction (CAI) should replace the traditional classroom in the United States. (Classes at home via computer as opposed to classes at school)
3. RESOLVED: Electronic cottage industries should be banned because people need to work in groups.

DEBATE SCHEDULE AND TEAMS

RESOLVED: _____

_____

_____

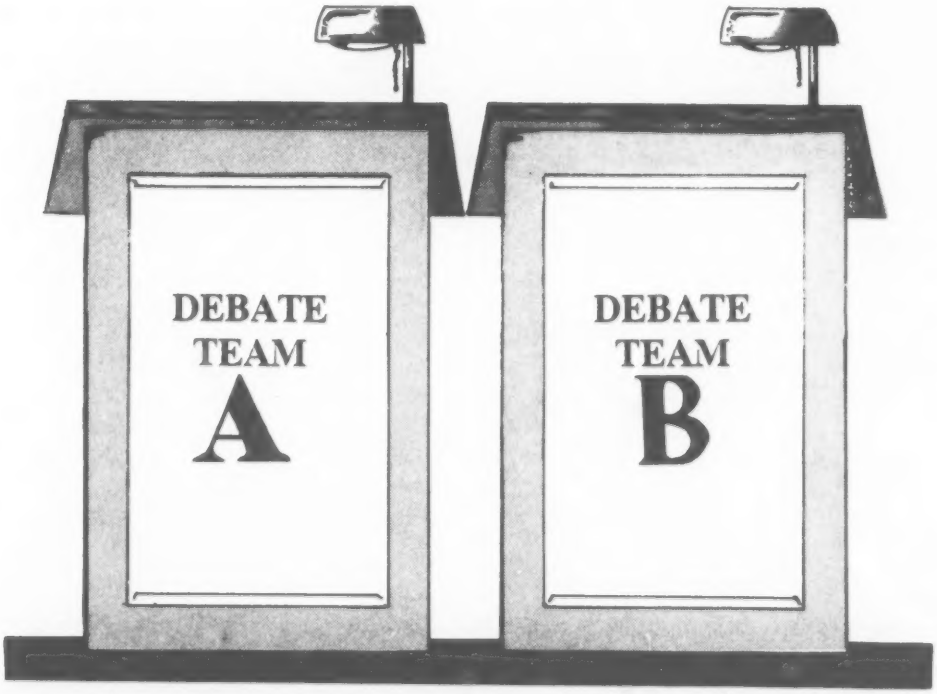
DATE OF DEBATE: _____

Debate Team #1

1. _____
2. _____
3. _____

Debate Team #2

1. _____
2. _____
3. _____



PHASE III-C: Individual or Small-Group Action Research

Use the Suggestions for Research and Report Topics found on pages 94 and 95 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations. Remember, the difference between Phase III-A and Phase III-C is ACTION!

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 106 of the Research Section to assess your involvement in the future. Your teacher will either provide copies or ask you to copy it.

Think about the following questions and write your responses on another sheet of paper. Place it in your notebook.

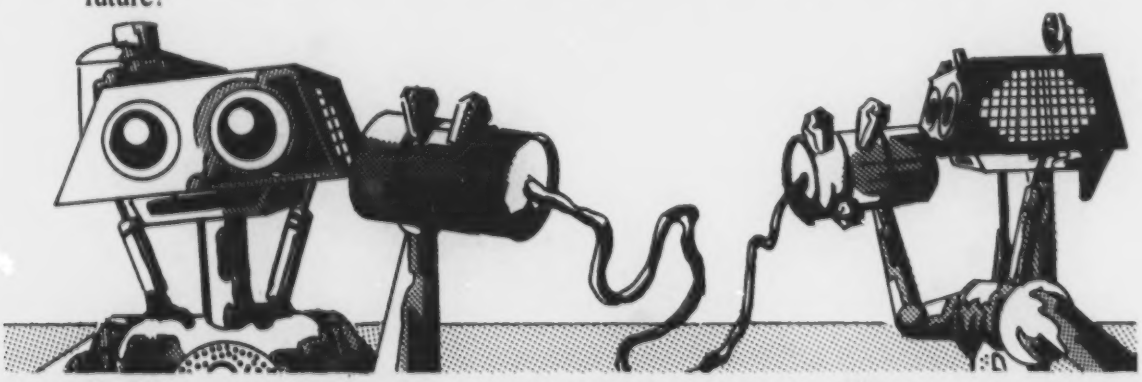
1. How will you avoid FUTURE SHOCK during the coming revolutions in microchips, telecommunications, and robotics?
2. How have your attitudes towards robotics changed since you started this unit?

PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 107 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

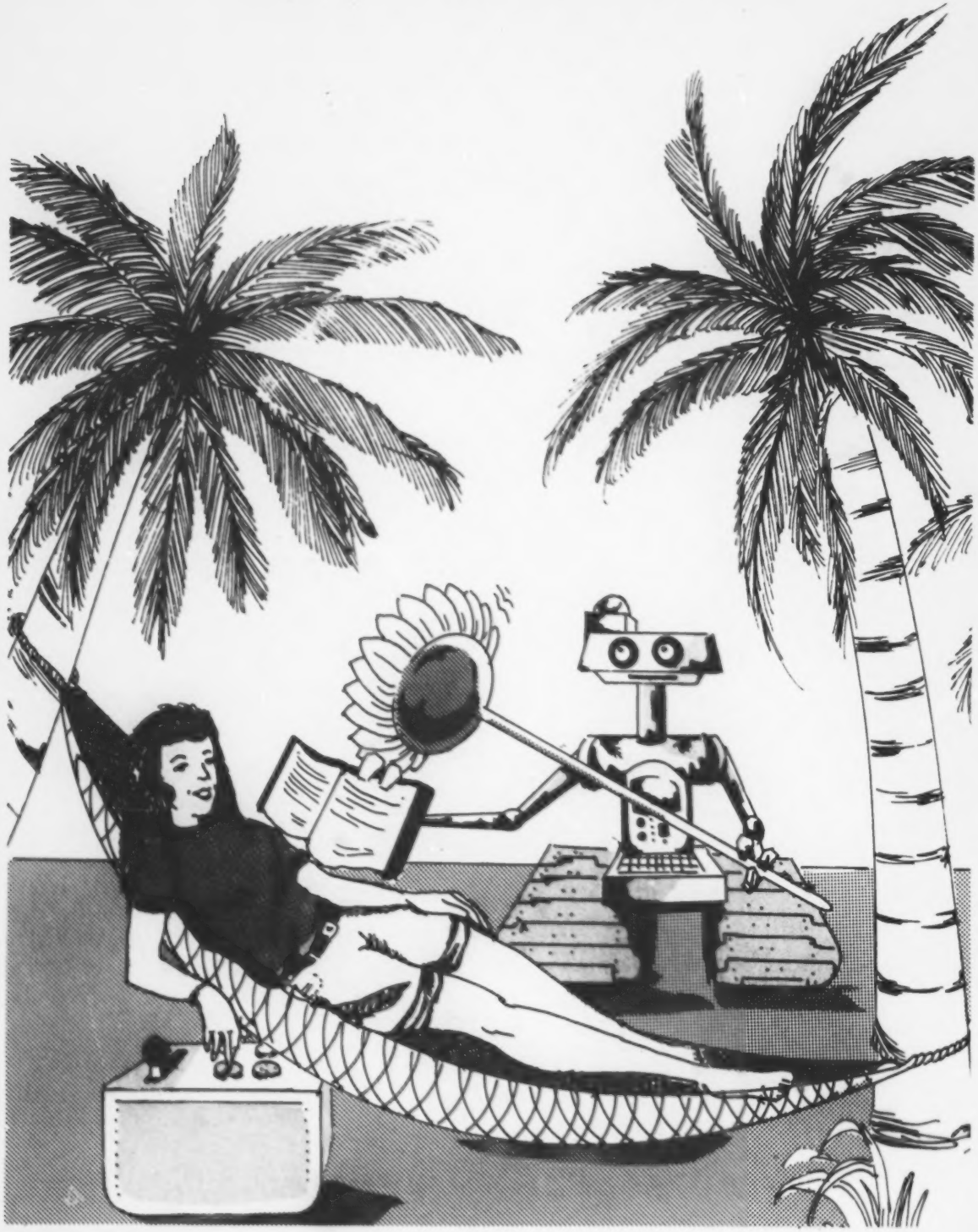
Review the section describing the use of brainstorming and the evaluation grid found on pages 23 and 24. Then follow the procedures as given by your teacher to think of new creative solutions and to develop criteria for the following problems. Choose the most appropriate solutions.

1. In what ways might you prepare for the age of robotics?
2. What curriculum changes would you recommend that will enhance communications in your future?



Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.

WORK, LEISURE AND EDUCATION



Work, Leisure and Education
Introductory Questions

The Industrial Age, which was so important to the quality of life improvement during the last four centuries, is dying. Your world is in the early stages of an "Information Age," a product itself of Industrial Age successes. Humanity has been thrust into a "push-button" era in which technologies and information will produce needed services and goods. As the world changes, information storage systems will reduce the work-time requirements of workers. Technologies and education will develop new kinds of work and professions which will require different philosophies and purposes for learning and training.

One important result of the change to electronic employment and lifestyle will be an increase in amounts of free time. The work ethic of the Industrial Age was related to hard work, a forty-hour work week, and limited free time. Workers of that era might have difficulties adjusting to the concept of shorter work schedules and more free time. Updated objectives for education might include more emphasis on lifelong learning, periodic retraining for new jobs, and programs regarding uses of free time.

As you develop and review your own philosophy about living in your future world, study the changing relationships between work, education, and leisure time.

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop a project based on three to five GROUP PROJECT QUESTIONS.

INFORMATION QUESTIONS

Write your answers to these questions on a separate sheet of paper for your journal.

1. Your ideas are important because they relate to you and the time when you will be an adult and a decision-maker. What kinds of employment will be available to you in the 21st century?

2. In what ways do you think educational programs could help students prepare for living in the next century, particularly in the areas of work and leisure?

INDIVIDUAL ACTIVITY QUESTIONS

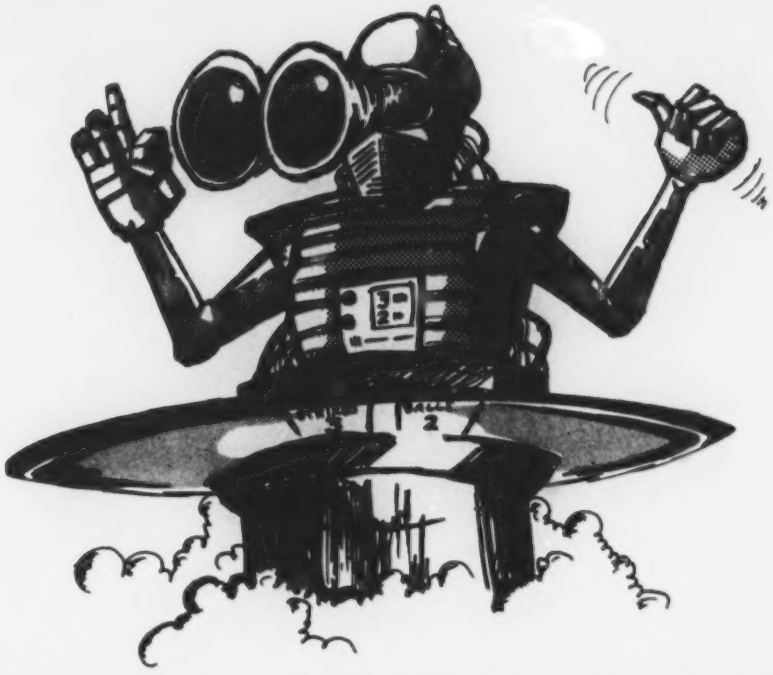
Use separate sheets of paper for your answers to the questions you select. Place them in your journal for reference, for help on other reports, and for class discussion.

3. What work would you like to do in 2009 A.D.? In 2043? In 2060? List three or four choices and describe why those kinds of work will be available in the years listed. Invent some new occupations that you think might possibly exist in those years. As an example, railroad trains could still have human engineers in 2009, but they might be run by an automatic-switch computer in 2037 and by an engine robot in 2054.

4. If the current work week is reduced in 2009 from forty hours to twenty, the amount of available free time would increase for all workers. What kinds of activities would you include in your extra free time?

5. Some jobs that are very important now might become nonexistent by the 21st century. Office equipment, for example, might include voice-activated machines that would replace both the typewriter and the typist. Computer-operated airplanes might no longer require human pilots. List other occupations that might not exist in 2015 A.D.

6. In professional baseball games, how would spectators and players complain about balls and strikes to an "electronic umpiring machine"? Would you like to play in a ball game with an umpiring machine? Why or why not? Draw a diagram showing how you think an umpiring machine would work.



7. In the Industrial Age, leisure was considered the opposite of legitimate work and, therefore, unimportant or wasteful. With more free time anticipated in the upcoming age of technology, the uses of that free time will become more important. Why might it be necessary to teach people how to make good use of their new free and leisure time?

GROUP PROJECT QUESTIONS

Responses to the first seven questions might be included for use with the group projects.

8. These are some examples of productive uses for free time: working at or teaching hobbies and crafts, volunteering in hospitals, coaching sports teams, writing stories, and helping in schools. Make your own list of productive uses for increased amounts of free time. Indicate the extent to which your uses would require special training or teaching. Describe how your suggested activities could be included in classroom learning programs.

9. Describe your ideas about the term "lifelong learning."

10. What do you think is meant by the term "recreation industry"? Why would or wouldn't you consider the recreation industry as a worthwhile profession in the new century?

11. There will be many jobs in the future that do not exist today. How will schools help students prepare themselves for working at future jobs? How might students help themselves prepare to live and work in a continually changing future?

12. Many futurists believe that numerous jobs, including many that will be developed in and for the Information Age, will become obsolete or outdated due to newer techniques and discoveries. Because of this, workers will need to retrain and change jobs up to six times during their working careers. What are your thoughts about the possibility of having several professions or types of employment in your future life?

13. What can you do now to prepare yourselves for future employment in jobs that do not currently exist?

Work, Leisure and Education
Words to Know

The words that follow are important because they relate to Work, Leisure and Education. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. computer literacy: _____

2. computerized vocational training: _____

3. cyberphobia: _____

4. Delphi technique: _____

5. ecotourism: _____

6. flextime: _____

7. Industrial Age: _____

8. Information Age: _____

9. lifelong learning: _____

10. maquiladora: _____

11. permanent part-time jobs: _____

Work, Leisure and Education
News Articles

In the first article, "Job Forecasts Are Rosy; Reality Is Grim," James M. Cypher asks what effect a U.S./Mexico free-trade agreement would have on our economy. He suggests that we examine our past in our attempt "to peer into the future." This article presents only one position relative to the free-trade agreement described. LOOK UP other articles regarding trade agreements and jobs.

Job forecasts are rosy; reality is grim

If the U.S./Mexico free-trade agreement is passed, as the Administration is pushing for, one should not expect an economic catastrophe. Rather, the slow and steady erosion in the earning power of the average U.S. worker, which began in the 1970's, will continue. Average weekly earnings in the United States declined by nearly 5% (adjusted for inflation) from 1986 through 1990.

As more U.S.-based corporations slip across the border in the aftermath of the free-trade agreement, this tendency will be accelerated. The broad mass market for U.S. products will be undercut by the restricted purchasing power of U.S. workers whose jobs will be lost to Mexican workers—who still toil for one-tenth of average U.S. wages.

(Excerpted from *The Los Angeles Times*, May 22, 1991.)

Those who favor the agreement say that 264,000 new U.S. jobs have been created since 1986, the year that Mexico began to drop trade restrictions. But, Cypher and others who share his point of view counter, 192,000 U.S. jobs have been lost since 1986 to the *maquiladora*, the Mexican assembly plants that have sprouted along the U.S./Mexico border.

American workers need jobs, and Mexican workers need jobs. Trade restrictions seem to create problems as well as solutions for these workers. In your journal, WRITE your responses to the following questions: How might jobs be available to all workers in the future? How would you solve trade-restriction problems in the future?

Some futurists/industrialists believe that the *maquiladora* programs will establish international cooperation in your future. What do you think? LIST in your journal the future advantages and disadvantages of the *maquiladora* programs.

FIND and LIST ten countries in which workers make much less in hourly wages than workers in comparable U.S. jobs. Why is or isn't it fair that workers of one country work for one-tenth the wages of workers of another country?

Are classrooms irrelevant to the physical needs of students? Have you ever thought about remodeling the building or the curriculum of your school? Read the following article for some new ideas.

Adolescents need active schooling

Too many eighth-grade classrooms are "irrelevant" to kids' lives, a new study says.

At an age when students are most interested in physical and social development, they're required to sit passively absorbing whatever a teacher offers, says the study by the National Association of Secondary School Principals.... It's based on reports from 162 educators in 41 states; each spent a day with an eighth grader.

They found "far too much dead wood," says study author John Lounsbury: "Old routines and practices that are no longer appropriate for, or effective with, early adolescents..."

Lounsbury says they need

physical movement, but must sit for long periods
interaction, but are expected to do their "own work"
mental excercise, but have "little opportunity to learn and apply critical skills"

The report, "Inside Grade Eight," echoes 1989 Carnegie Council finding that called for "individualized, responsive and creative approaches."

(Excerpted from *U.S.A. Today*, January 11, 1990.)

WRITE in your journal your ideas regarding the following questions: How would you eliminate "dead wood" programs in a classroom of the future? What is a critical skill? How could you improve critical skills, or critical thinking, in your future?

CREATE or DESCRIBE in your journal a future classroom. Use five of the following categories in your description: critical thinking, interaction, physical movement, mental exercise, irrelevant curriculum, passivity, and individualized approaches.

There are so many technological and electronic advances that will improve 21st-century lifestyles that people overlook another basic need: taking care of the planet, the place where they will live! The next news item describes a new term related to ecology, *ecotourism.*

ECOTOURISM: Can it protect the planet?

Statistics are not readily available, but by some estimates as many as five million Americans took a trip last year with an environmental theme.

More and more Americans are taking responsibility for preserving...special places. They are planting trees in Nepal, clearing hiking trails in Ecuador, and providing alternative income in Africa and Asia for subsistence farmers, who would otherwise cut down trees for farmland, only to have the topsoil quickly wash away.

A new word has entered the lexicon of travel: *ecotourism.* Born of the environmental movement, ecotourism promises the traveler an opportunity to help save the planet and get a suntan in the process.

A kinder, greener tourist is emerging. The ecotourist is asking tougher questions of tour companies, perhaps choosing only those that funnel a portion of their profits to local conservation projects. The ecotourist is more likely to choose low-impact transportation: a canoe rather than a cruise ship, walking rather than a Land Rover. And the ecotourist prefers small, locally owned lodges to huge hotels or resorts owned by multinational corporations.

Nearly 500 companies, most quite small, offer trips with an environmental theme, and new ones are cropping up each year. Destinations like the rain forest of the Amazon Basin, the Galapagos Islands and Costa Rica are especially popular.

(Excerpted from *The New York Times*, May 19, 1991.)

Ecotourism is an important form of leisure activity as we approach the 21st century because the planet has reached an extremely fragile stage. Do you feel that within the near future (let's say 10 to 15 years) most, or all, trips, cruises and vacations should have an environmental theme or concern? Or do you feel, as some do, that vacations should be free of donations, lectures and concerns?

The Sierra Club runs 70 "service" trips; travelers spend half their time working on conservation projects, such as trail clearing on California's Santa Cruz Island or documenting archeological sites in Colorado. Is this your idea of leisure, or vacation, time? How great a commitment are you willing to make to the environment? WRITE your responses to these questions in your journal.

The Ecuadorean government has an official limit of 25,000 each year to the Galapagos Islands. However, last year the islands had nearly 50,000 visitors. Why might this happen? How could the situation be corrected in your future? How can governments be made aware of fragile environments and ecotourism? Why are the Galapagos Islands important? Where will you find information about the importance of these islands? What role might you play in the future relating to new concepts of leisure and ecotourism? WRITE your answers to the above questions in your journal for future class discussion.

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Work, Leisure and Education
Study Unit

PHASE I: Reaction to the Articles

Examine the articles and clippings in your file entitled "Work, Leisure, and Education" and the files in the CLASS LIBRARY of future-related items. Respond to the questions below in addition to those on the Reaction to the Articles form found on page 102 of the Reference Section. Your teacher will either provide copies of this form or ask you to copy it. Place your reactions in your notebook.

1. How do the articles on pages 56 and 57 of your workbook relate to other news items that you have read recently? How many new articles relating to work, leisure or education have you read and added to your file?
2. Most of the steel in the United States is currently being produced in small plants. Do any of the articles you have collected refer to new industries or innovations in industries in your city or state?
3. What do you think is meant by the term "leisure industry," as in "I think I'll get into the leisure industry"? How might emerging leisure concepts affect your family (i.e., lifestyle, travel, vacations, all-year schools, working parents, and work schedules)?
4. What is the relationship between less work time, more leisure time, and education? How might education better prepare students for the anticipated increase in leisure time ahead?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the Forecasts form on page 103 in your Reference Section. Your teacher will provide copies of this form or ask you to copy it. Use it as a guide as you make your forecasts about the future of Work, Leisure, and Education. Forecasting the future is usually based on past happenings and present-day research.

1. What kinds of changes do you think might take place in educational programs that will relate to work and leisure in your future?
2. Refer again to the Life Activities Charts on pages 97 and 98. How might a pattern of alternating periods of work and education and/or leisure be introduced as a new concept in a school curriculum?
3. Describe your own ideas and plans about working conditions and education at the start of the 21st century. (How old will you be? What will you be doing?)
4. What will you plan to do with your leisure time?

PHASE II-B: Alternative Futures for Life in the 21st Century as a Result of Advances in Work, Leisure, and Education

Use the Alternative Futures form on page 104 in your Reference Section as a guide as you construct a future which must absorb the impact of your forecasts. Your teacher will either provide copies of the form or ask you to copy it.

1. Project twenty-five and fifty years ahead with your ideas about work, about leisure, and about education for work and leisure. If you can find numerical data to support your projections, put your figures on a graph to show trends starting with now and moving into the future. Check the graphs on pages 97 and 98 in the Reference Section.
2. How will your ideas about education and work contribute to an improved standard of living?

PHASE III-A: Your Area of Individual and Group Research

Use the Research/Report Outline form on page 105 in your Reference Section. Your teacher will provide copies of the form or ask you to copy it. This form will be used as the top page of your report. Your teacher can use it as a guideline for evaluating your report. You may wish to review the material on Focus Questions on page 7.

LIST your interests in telecommunications and robotics on a separate paper. Refer to the Introductory Questions at the beginning of this unit. These questions can be a starting point for your area of research. REWORK the Introductory Questions and your interests into one or two Focus Questions for your investigation. The following is an example of a focus question: HOW WILL CHANGING WORK TECHNOLOGIES AFFECT MY EDUCATION?

On the Outline form, fill in the TOPIC and one or two FOCUS QUESTIONS. Under PLANNED RESOURCES, indicate which of these materials you expect to use in your report. The ORGANIZATION section is a modified outline for your report:

1. **Introductory Statement:** Why did you select the topic? How do you plan to go about answering the focus question(s)?
2. **Resource Summary:** How will you use the resources you have selected? Where will you find the resources? If you plan an oral report, will you use any audio or visual aids?
3. **Concluding Statement:** What has been the result of your research? What conclusions will you present to the class or to the teacher? Did you expect thess conclusions when you formulated your research design?

TITLE OF REPORT: _____

DATE OF REPORT: _____

Note: These are written reports, but, in addition, some of you will be selected to present oral reports as well.

PHASE III-B: Scenarios

In futures research, scenarios are stories that describe possible and/or likely courses of related future events. Look up the definition of "scenario" in your GLOSSARY. You may already have written one scenario as part of your assignment on page 29.

Scenarios are interesting as well as informative in that each story presents the reader with different options. No two writers using the same resource materials will arrive at the same projections. Researchers study scenarios to learn a variety of concepts regarding potential future happenings.

Using the information on page 29 as a guide, WRITE a scenario about changes in work, leisure, or education between now and 2005. Refer to your previously written scenario for ideas about social and cultural changes in that time period. You might wish to put future employment concerns, uses of increased amounts of leisure, or changes in education in the context of your earlier scenario. Your new assignment, however, should be neither an addition nor an updating of the first, but rather a new piece of writing dealing with your topic. Share your scenario with your class and your teacher. Keep it in your journal for reference.

PHASE III-C: Individual or Small-Group Action Research

Use the Suggestions for Research and Report Topics found on pages 94 and 95 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations. Remember, the difference between Phase III-A and Phase III-C is ACTION!

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 106 of the Research Section to assess your involvement in the future. Your teacher will either provide copies or ask you to copy it.

Think about the following questions and write your responses on another sheet of paper. Place it in your notebook.

1. In what ways will you deal with increased amounts of free time caused by technology in the workplace?
2. What do you want or need from your education that will prepare you and your friends for a future that involves more training and more kinds of jobs?

PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 107 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

Review the section describing the use of brainstorming and the evaluation grid found on pages 23 and 24. Then follow the procedures as given by your teacher to think of new creative solutions and to develop criteria for one or more of the following problems. Choose the most appropriate solutions.

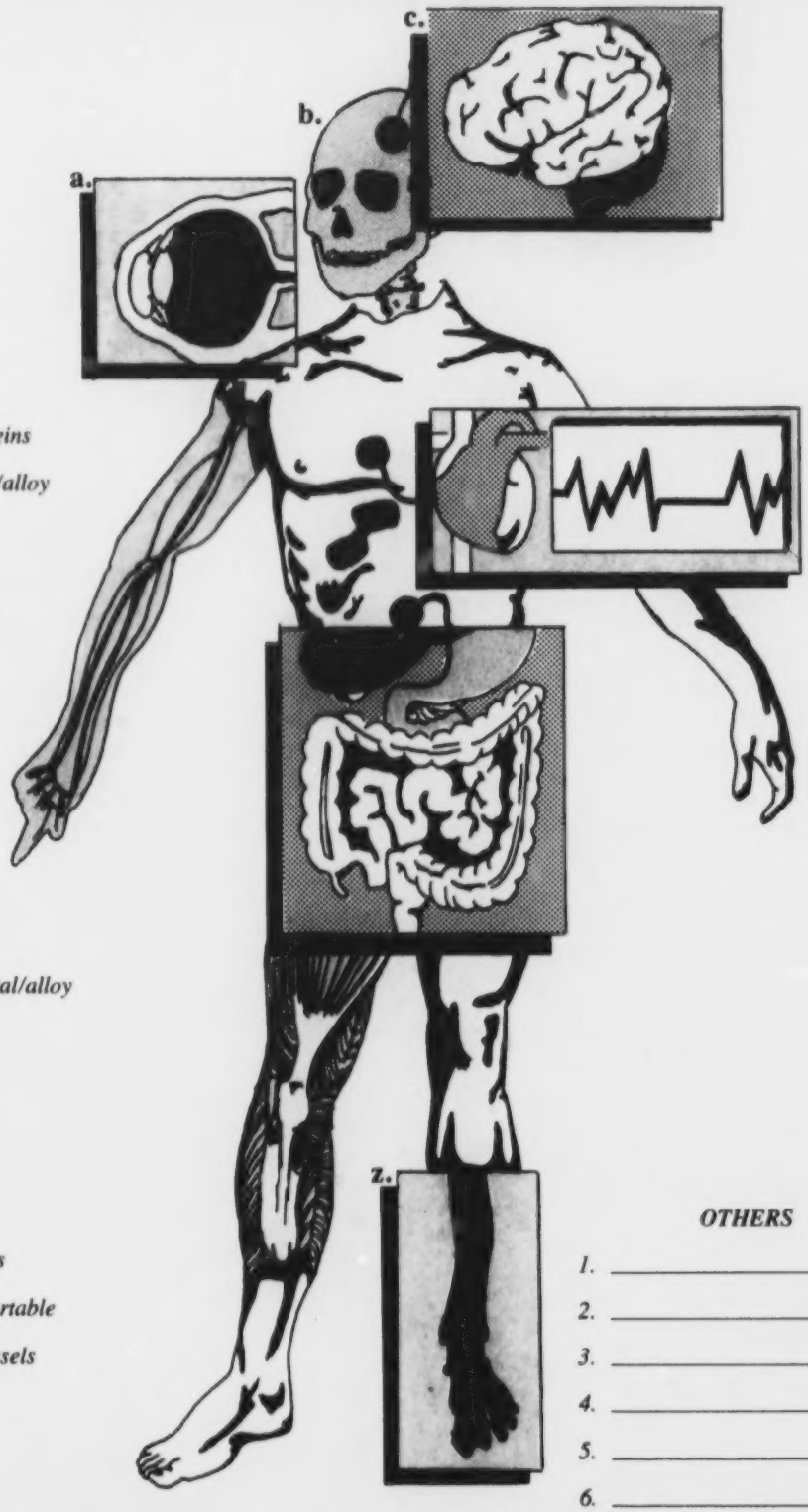
1. In what ways might students determine which current jobs will be nonexistent in the near future?
2. In what ways might students forecast future jobs that do not exist at this time?
3. In what ways might students study forecasts of the future that will help them to select careers/vocations?
4. In what ways might students plan to make use of the increased periods of free time in the future?
5. In what ways might students prepare for factory employment where some sections of the work force will be made up of humans and others of robots.

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.

TECHNOLOGIES FOR LONGER LIFE

Corrective. . . Life Saving. . . Cosmetic

HEALTH/MEDICAL TECHNOLOGIES AND YOUR LIFE



a. contact lenses
b. wig
c. brain implant proteins
d. head plates, metal/alloy
e. glasses
f. face lift
g. laser eye surgery
h. face repair
i. hearing aid
j. false teeth
k. larynx repair
l. bridge, teeth
m. artificial eye
n. fused vertebrae
o. shoulder joint, metal/alloy
p. heart transplant
q. lung transplant
r. artificial hand
s. liver transplant
t. artificial heart
u. bypass heart valves
v. kidney dialysis, portable
w. synthetic blood vessels
x. artificial blood
y. leg braces
z. artificial leg

OTHERS

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Health/Medical Technologies and Your Life
Introductory Questions

Many changes in health and medical technologies occurred in the 20th century. Can you add to this list of four great accomplishments? WRITE these four and your additions on another paper for your journal.

1. Small pox was eradicated from the world through the coordinated efforts of the World Health Organization.
2. Vaccines and innoculations were developed to prevent many serious diseases. LIST some of those diseases.
3. In America the average life expectancy rose from forty-seven years in 1900 to seventy-one years by 1978. PROJECT what it might be in 2010.
4. Infant mortality decreased in the 20th century. In 1915 about ten out of every 1,000 babies died before reaching the age of one. By 1966, that rate had been reduced to 1.6 deaths under age one for every 1,000 births.

LIST the following terms in your Future Dictionary. MARK an "X" in front of those you recognize. Define these terms in your own words. Use a dictionary or ask a doctor and/or a nurse for help. Add definitions of other new words as you find them.

artificial heart organ transplant neuro-chemistry synthetic blood
hearing-aid implant least-invasive internal organ exploration and surgery
radioisotropic scanning geriatric social worker clot-dissolving medicines
chemical cancer clues laser eye surgery organ-transplant networks
micro-surgery brain pacemaker artificial joints

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop a project based on three to five GROUP PROJECT QUESTIONS.

INFORMATION QUESTIONS

Write your answers to these questions on a separate sheet of paper for your journal.

1. How many persons do you know who have replacement parts or organs in their bodies? What parts have they had replaced?

2. In what year will you celebrate your 100th birthday? What kind of party will you want? Why would anyone want to live to be one hundred years old or more?

3. To what extent do you think new medical practices will help you live longer? How will the availability and use of synthetic blood help doctors schedule and plan operations?

INDIVIDUAL ACTIVITY QUESTIONS

Use separate sheets of paper for your answers to the questions you select. Place them in your journal for reference, for help on other reports, and for class discussion.

4. "If the best medical care in the United States were available to everyone, it would only increase life expectancy by about three years. But if everyone were to eat sensibly, stop smoking, and exercise moderately, life expectancy would increase by eleven years."—Security Pacific National Bank newsletter, *Future Scan*, Number 359, December 27, 1983.

   What does this quote suggest to you about hopes for living a longer life?

5. Are damaged spinal columns irreparable? Some recent research has given new hope for repair or bypass operations for spinal-column injuries. One such procedure would involve transplants of healthy nerve cells into the damaged tissues. What are your thoughts about this kind of research, especially for people with spinal-column damage?

6. Explain the relationships between new medical technologies and projections for longer life expectancies.

GROUP PROJECT QUESTIONS

Responses to the first seven questions might be included for use with the group projects.

7. Review the health and medical terms listed at the start of your study unit. From news and other information sources, such as science magazines or newspapers, list ten more new concepts in health and medical advances.

8. The date is 2028 A.D. Members of your group work in a "self-help" store. You sell component parts that can be attached to the human body to help the recipient have better health. You also sell diet, vitamin and exercise programs that are designed to help people live longer with more active bodies and more alert minds. Write two skits about customers looking for your kinds of services. You might want to present your skits to the class.

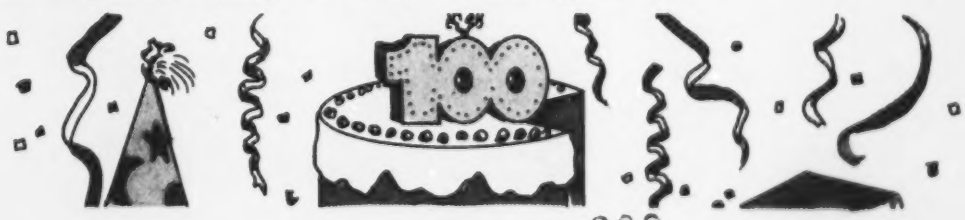
9. Have you ever seen the television program *The Six-Billion-Dollar Man*? It was based on the science-fiction novel *Cyborg*. (See the RECOMMENDED READING LIST in the Reference Section.) The plot of *Cyborg* involves a crash victim whose broken body was put back together in a mass of plastic wire and atomic metal, all fused to the remaining parts of his body. The term "cyborg" describes people who have artificial body parts or organs in their bodies. Some future-oriented companies manufacture artificial body parts. The medical profession has accomplished many successful transplant operations of vital organs. Make a list of transplant and artificial body parts and organs that could help people live longer and be more alert and active. Review your responses regarding the body drawings at the start of this section and the list of health/medical terms in the introduction to this section.

10. "Doc-in-the-box" is a new term for small, urgent-care health centers that provide medical care for walk-in, walk-out patients. What kinds of health services might be provided at such centers? What kinds of health services are not likely to be offered?

11. Many people have shifted their health concerns from illness repair to maintenance of good health. Is this a practical concept? Why or why not?

12. New diseases continue to develop in our society. AIDS is a well-publicized example. List others that have appeared in the past few years. What solutions would you suggest to alleviate new diseases (i.e., research, education, legislation)?

13. The average life expectancy in the United States rose from forty-seven years of age for people born in 1900 to seventy-four for those born in 1981. Describe how a larger percentage of senior citizens will affect your future plans for working, attending school, traveling and providing your family with housing and food.



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Health/Medical Technologies and Your Life
Words to Know

The words that follow are important because they relate to Health/Medical Technologies and Your Life. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. acquired immune deficiency syndrome: _____
2. acupressure: _____
3. acupuncture: _____
4. brain pacemaker: _____
5. central nervous system: _____
6. geriatric social worker: _____
7. laser eye surgery: _____
8. organ-transplant network: _____
9. preventative medicine: _____
10. synthetic blood: _____

Health/Medical Technologies and Your Life
News Articles

Have you considered any branch of the medical profession as a career? Medicine, pharmacy, hospital administration and nursing are well-known professional objectives for many students. Due to modern medical advances, there are many newer jobs within or related to the medical field.

The following article discusses future careers in health-related professions, including support jobs such as bookkeepers, accountants and computer operators. WRITE in your journal your opinions regarding careers in the health profession that could be both satisfying as a career and economically worthwhile for your future lifestyle.

LIST fifteen future health-industry jobs in your journal. In class compare your list with those of your classmates. Start your list with medical doctors, nurses, physical therapists, researchers, ambulance first-aid technicians and computer programmers.

Health jobs surge; medical costs may follow

The number of jobs in American health care is soaring at a rate three times faster than the growth of the population. . . . Thirty-seven of every 1,000 Americans worked in health care last year, compared with about 28 for every 1,000 just ten years earlier.

Experts on the economics of health care attribute some growth to the increasing number of older Americans and to advancements in medical technology that require additional people to push the buttons and decipher the printouts.

But many new jobs also owe their existence to the rapid growth in 25 years in the number of people covered by government and private health insurance.

Based on present trends, the Labor Department said seven of the ten fastest-growing occupations in the 1990's will be in health services.

(Excerpted from *The San Diego Union*, March 11, 1990.)

The news article also reports concerns about the rising costs of health care. A longtime debate continues between the insurers and individuals who pay the costs and the hospitals and doctors who provide the services. One group would hold the line on expenses. The other group sees a need for increasing costs to assure better service. What is you opinion about the rising costs for health care? How can health care be affordable to everyone? ORGANIZE debate teams, pro and con. Refer to page 32 for help in planning a program of debates. One possible title for a debate topic is "National Health Plan vs. the Present System."

A comparison of increasing costs related to health care in the United States, England and Canada are shown on a table in the Reference Section. Figures such as these might be why many groups are calling for improvement in health care financing. EXPLAIN how the information from the table might help you to respond to the questions in the above paragraphs and to plan for your debate.

People live longer. Life expectancy for a person born in 1899 was about 40 years. For people born in the 1990's it has risen to almost 80 years. Due in part to new technologies and health standards, people live longer and are more active and more mentally alert than their parents and grandparents were at the same age. The reasons for this increase in life expectancies include better understanding of personal health, improved medical and health technologies, and better insurance and safety programs.

The article at the right is about a newborn baby with a usually fatal heart defect. His parents took him to a hospital where advanced medical technologies were studied and used. While waiting for a heart transplant donor, the baby was given a drug designed to keep open a heart blood vessel that usually closes up after birth.

Re-read the first statement in the news item. CONSIDER and DISCUSS in class the following question: Do you think the baby healed himself or do you believe the care and drugs he received in the hospital were partly responsible?

Newborn's heart defect heals in medical "miracle"

An infant diagnosed with a usually fatal heart defect healed by himself, amazing doctors who thought a transplant was the only way to save his life.

Dr. Gundry, a pioneer in infant heart transplant surgery, said it is unlikely that the child will ever need a transplant.

The boy's damaged heart grew stronger as he waited for a heart transplant donor.

Doctors treated [the boy] with a drug that kept open a heart blood vessel that normally shuts down after birth.

A few weeks ago, doctors noticed that the baby's left ventricle had grown considerably and was gradually becoming functional.

A surgical team successfully performed an operation . . . to enlarge [the boy's] narrowed artery and to close the artery that was no longer needed.

(Excerpted from *The San Diego Tribune*, October 8, 1990.)

What are the implications of new medical technologies which might affect your lifespan? LOOK for news items regarding new medical technologies which save lives; keep them in your file for future reference.

Only a few years ago, heart attacks in adults were often fatal or totally disabling. In the last quarter century, however, bypass surgery has become a common procedure for alleviating heart problems. More recently, a new procedure has been used to break loose the blockages in coronary arteries, a common cause of heart failure. A balloon is inserted through the larger blood vessels to the coronary artery near the heart. It is then inflated to push aside the blockage and improve the flow of blood. An even more revolutionary development—with future-related implications for you and your friends—is the use of a a laser procedure to vaporize coronary blockages. As the following article relates, patients may soon be able to avoid bypass operations for heart trouble.

This article describes one of many laser procedures in medicine. As a class or group project, RESEARCH and LIST in your journal five or more uses of laser procedures in your medical and health future. Look up the meaning of *laser* in your dictionary and in a recent encyclopedia. You might want to read how lasers are used in eye surgery and in dentistry.

The patient in the news item stayed awake during the one-hour procedure. WRITE your ideas about this operation in your journal. DESCRIBE how you would feel if you stayed awake and watched your own operation.

Laser treatment brings euphoria

San Diegan Gale Sankey, 70, a retired engineer, puts it this way, "Boy, I feel great."

No more upper arm pain—a signal of heart disorder—for Sankey now. Instead, a feeling of euphoria.

Sankey was the beneficiary last week of eximer laser coronary angioplasty (laser heart treatment).

[The treatment] is performed by transmitting cool-tipped laser energy through a tiny bundle of optical fibers enclosed in a cather tip, which is sent through a major artery in the leg toward the heart.

When the tip contacts coronary blockages, the laser emits pulses of . . . high energy light that vaporizes them. The patient remains awake during the one-hour procedure . . . and only a local anesthetic is given.

(Excerpted from *The San Diego Tribune*, November 16, 1990.)

STUDENT REPORTERS: Look for articles pertaining to cancer, AIDS, the sale of body parts, longer life expectancy, health professions, heart diseases, the common cold, stress-related mental illness, and Alzheimer's Disease. WRITE an article for your class newspaper or magazine based on the information you find.

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Health/Medical Technologies and Your Life
Study Unit

PHASE I: Reaction to the Articles

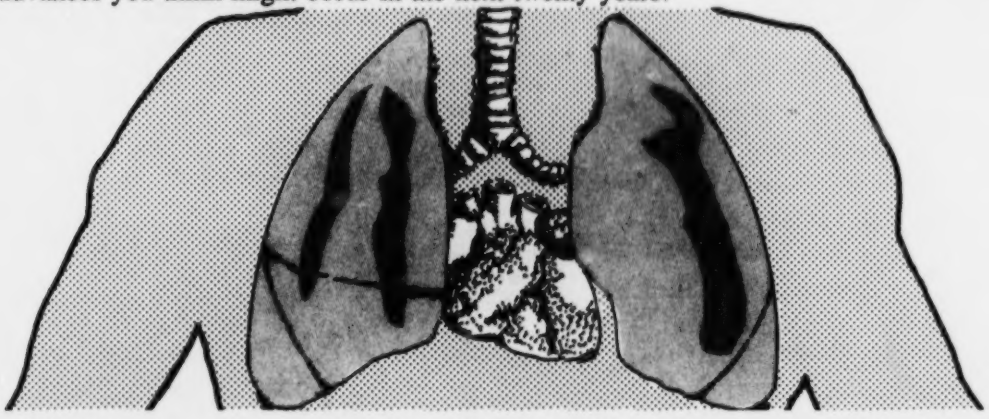
Examine the articles and clippings in your file entitled "Health/Medical Technologies and Your Life" and the files in the CLASS LIBRARY of future-related items. Respond to the questions below in addition to those on the Reaction to the Articles form found on page 102 of the Reference Section. Your teacher will either provide copies of this form or ask you to copy it. Place your reactions in your notebook.

1. Why might information in news sources about cancer be important to you?
2. Describe how life extension is related to research in medicine and health.
3. From your newspapers at home, make a list of news item headings that are related to medical and health technologies and life spans.
4. How can people help improve their own chances for living longer?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the Forecasts form on page 103 in your Reference Section. Your teacher will provide copies of this form or ask you to copy it. Use it as a guide as you make your forecasts about the future of Health/Medical Technologies and Your Life. Forecasting the future is usually based on past happenings and present-day research.

1. Based on your responses to the articles you read, what could you forecast about possible life spans for people in the 21st century?
2. Among the new illnesses, Alzheimer's Disease afflicts senior citizens, limiting their ability to think and remember. What kinds of research might be undertaken currently which would help people remain both physically active and mentally alert in their senior years?
3. With others in a small group, make two lists of medical achievements. The first list is for medical advancements in the past twenty years. The second is for medical and health advances you think might occur in the next twenty years.



PHASE II-B: Alternative Futures for Life in the 21st Century as a Result of Advances in Health/Medical Technologies.

Use the Alternative Futures form on page 104 in your Reference Section as a guide as you construct a future which must absorb the impact of your forecasts. Your teacher will either provide copies of the form or ask you to copy it.

1. Your future will have something new: YOUR ideas and plans and information about living longer, in better health, and with more security. How will your ideas affect your family, close friends, and neighbors?
2. How might your ideas about living longer affect people in other parts of the world?
3. What relationship is there between food, dieting and longer life?
4. With more people living longer and the population of the world increasing rapidly, what new kinds of problems will your generation need to face, such as food supply, energy sources, and more senior citizens?

PHASE III-A: Your Area of Individual and Group Research

Use the Research/Report Outline form on page 105 in your Reference Section. Your teacher will provide copies of the form or ask you to copy it. This form will be used as the top page of your report. Your teacher can use it as a guideline for evaluating your report. (You may wish to review the material on Focus Questions on page 7.)

LIST your interests in medical sciences and longer life spans on a separate paper. Refer to the Introductory Questions at the beginning of this unit. These questions can be a starting point for your area of research. REWORK the Introductory Questions and your interests into one or two Focus Questions for your investigation. The following is an example of a focus question: HOW WILL THE NEW MEDICAL ADVANCES HELP ME LIVE LONGER?

On the Outline form, fill in the TOPIC and one or two FOCUS QUESTIONS. Under PLANNED RESOURCES, indicate which of these materials you expect to use in your report. The ORGANIZATION section is a modified outline for your report:

1. **Introductory Statement:** Why did you select the topic? How do you plan to go about answering the focus question(s)?
2. **Resource Summary:** How will you use the resources you have selected? Where will you find the resources? If you plan an oral report, will you use any audio or visual aids?
3. **Concluding Statement:** What has been the result of your research? What conclusions will you present to the class or to the teacher? Did you expect these conclusions when you formulated your research design?

TITLE OF REPORT: _____

DATE OF REPORT: _____

Note: These are written reports, but, in addition, some of you will be selected to present oral reports as well.

PHASE III-B: A Class Newspaper or Magazine

You and your class will have many opportunities to write reports regarding living in the future. Plan and publish a class newspaper or magazine using all class members' reports. At a class meeting decide purposes for your newspaper/magazine. What topics or kinds of topics will you cover? Who will read it? How many readers would you like to have?

What does your newspaper need? Put a check next to each applicable item. Add your own ideas to the list.

____ Reporters

____ Editorial staff

____ Distribution methods

____ Other: _____

____ Advisor

____ Printing equipment and supplies

____ Friendly typing class

____ Other: _____

All students are reporters. Some may also be editors; the eidtors will coordinate the news items, assign tasks, and help reporters with their stories. Give your newspaper a name and set up requirements for articles and stories. The following questions will help you set those requirements.

1. Will your paper have one or two columns on a page?
2. How many lines per story will reporters be required to write?
3. How will reporters write the headings for their stories?
4. Will reporters use a byline to start their stories or will they use initials at the end?

Reporters turn in their stories about future-related medical and health advances and life-extension developments. Editors check the stories for context and language usage and then organize the stories and articles into your class newspaper. Each issue of the paper should be dated.

Members of the class will print the newspaper, collate it, and distribute it. Recipients might include all members of your class, teachers, and other staff members determined by the class.

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PHASE III-C: Individual or Small-Group Action Research

Use the Suggestions for Research and Report Topics found on pages 94 and 95 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations. Remember, the difference between Phase III-A and Phase III-C is ACTION!

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 106 of the Research Section to assess your involvement in the future. Your teacher will provide copies or ask you to copy it.

Think about the following questions and write your responses on another sheet of paper. Place it in your notebook.

1. Of the new medical and health technologies, list five or six you believe will be beneficial as you grow older and assume adult responsibilities.
2. How will these new technolgies help you?

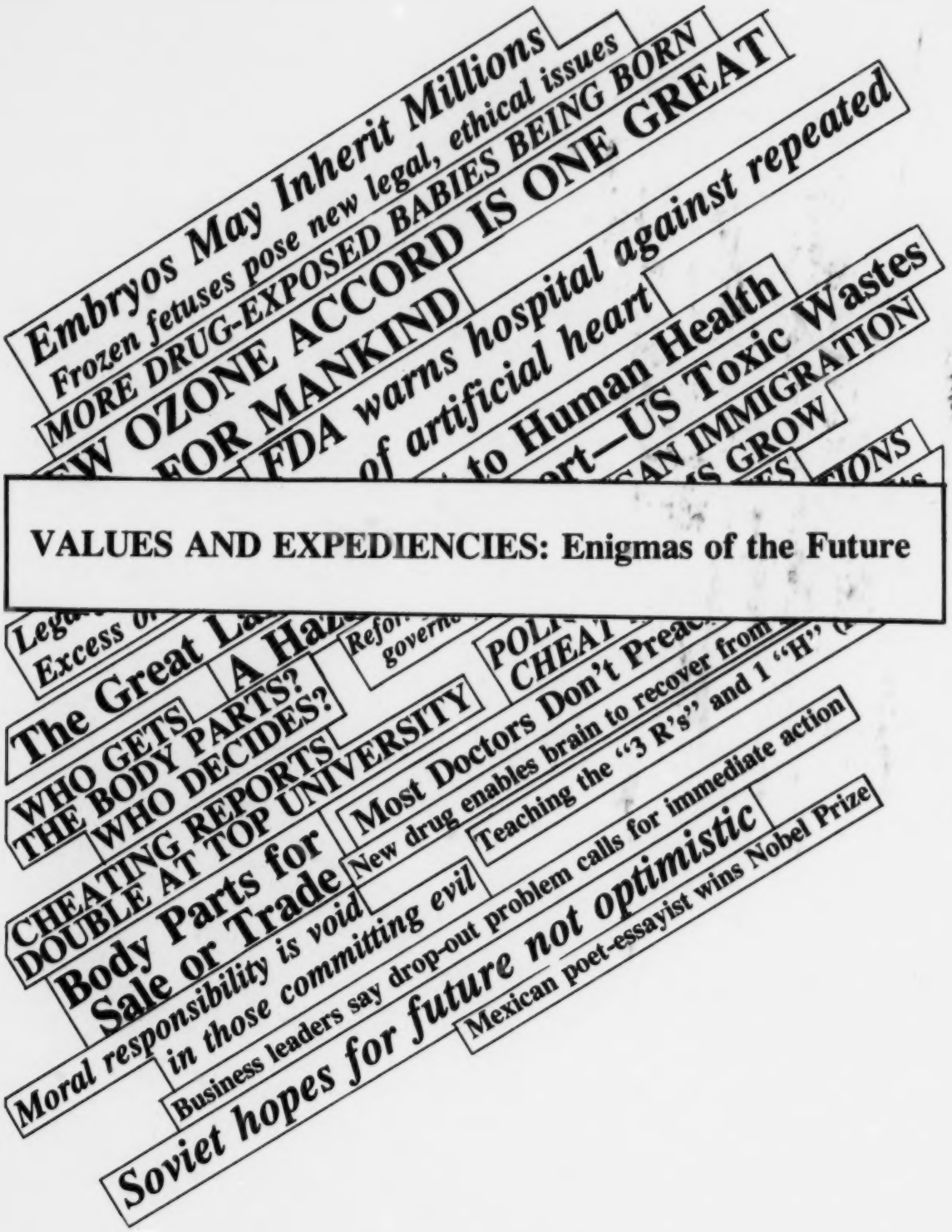
PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 107 of the Reference Section. Your teacher will either provide copies or ask you to copy it.

DISCUSS this statement in a class session: As medical and health technologies improve, the population will continue to increase. DETERMINE one problem based on that statement for the top of your evaluation grid.

Review the section describing the use of brainstorming and the evaluation grid found on page 11. Then follow the procedures as given by your teacher to DETERMINE ten possible alternative solutions to the problem and to DECIDE five criteria against which each solution will be rated.

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.


Embryos May Inherit Millions
Frozen fetuses pose new legal, ethical issues
MORE DRUG-EXPOSED BABIES BEING BORN
W OZONE ACCORD IS ONE GREAT
FOR MANKIND
FDA warns hospital against repeated
of artificial heart
to Human Health
ort—US Toxic Wastes
AN IMMIGRATION
S GROW
VALUES AND EXPEDIENCIES: Enigmas of the Future
The Great
A Hai
WHO GETS
THE BODY PARTS?
WHO DECIDES?
CHEATING REPORTS
DOUBLE AT TOP UNIVERSITY
Body Parts for
Sale or Trade
Most Doctors Don't Preac
New drug enables brain to recover from
Teaching the "3 R's" and 1 "H"
Moral responsibility is void
in those committing evil
Business leaders say drop-out problem calls for immediate action
Soviet hopes for future not optimistic
Mexican poet-essayist wins Nobel Prize

Values and Expediencies
Introductory Questions

Futurists study trends and make projections regarding value systems in your future. These new systems will have many variables, but there will be several recurring projections. One projection, for example, could show that people and societies will continue to improve both the quality and the duration of human life. A second projection might see a greater interaction between society, communities, governments and schools. A third projection might look at the need for global understanding in an overpopulated, interdependent world.

These projection examples are not the only components of the changing value system, but they are an important starting point for your research into your future lifestyle. Add your own projections for your future which will deal with local and global cooperation, improved education and lifestyles and values.

Student Assignments: Include your opinions as well as factual information in your responses and your report.

1. Respond to ALL INFORMATION QUESTIONS.
2. Select two to four INDIVIDUAL ACTIVITY QUESTIONS as a basis for a research report and/or a project.
3. With others in a small group, develop a project based on three to five GROUP PROJECT QUESTIONS.

INFORMATION QUESTIONS

Write your answers to these questions on a separate sheet of paper for your journal.

1. Suppose your friend made the following statement: "My neighbor decided to choose the expedient way." What might your friend mean?

2. The first sentence of the text on this page begins, "Futurists study trends and make projections." What do you think is meant by this sentence?

3. Think of times when your personal interests differed from those of the group. How were those situations resolved?

INDIVIDUAL ACTIVITY QUESTIONS

Use separate sheets of paper for your answers to the questions you select. Place them in your journal for reference, for help on other reports, and for class discussion.

4. Between 1956 and 1972, 34 million gallons of toxic chemicals were dumped in the Stringfellow Acid Pits near Glen Avon, CA. The water supply was found to be contaminated with radioactivity and the Dept. of Health provided free bottled water to anyone within a 250-home area. Develop a paper that deals with the TOXIC WASTE vs. ENVIRONMENT issue. Consider the following questions: Why were toxic wastes dumped for 17 years in a location only two miles from town? How will we deal with toxic wastes in the future? How would you react if you were told to drink bottled water because your water supply was radioactive? How could you be sure the bottled water was safe?

5. What are the possibilities for a suitcase war in the next fifty years? Twenty-five years? Two years? Can suitcase wars be prevented? (See the Glossary in the Reference Section.)

6. Airbags in all automobiles would save thousands of lives each year. But the propellant that inflates the bags, sodium azide, has been identified by the National Institute of Occupational Safety and Health as a suspected mutagen. Up to 90% of known mutagens are cancer-causing agents. Develop a paper describing how this problem might be solved.

7. Develop a paper which either agrees or disagrees with the LIFEBOAT ETHIC. (See the Glossary in the Reference Section.)

GROUP PROJECT QUESTIONS

Responses to the first seven questions might be included for use with the group projects.

8. Create a VALUE SYSTEM for the future, listing ten items and ranking them. Put the highest priority at the top. Your first item might be PROVIDING THE BEST POSSIBLE EDUCATION FOR ALL STUDENTS. Get into groups of five. Share your value-system list with the other group members and arrive at a consensus. One member of each group will write the agreed-upon list on the board for a class critique.

9. Would it be difficult to establish a VALUE SYSTEM in a pluralistic society? How could a future value system be fair to all minorities?

10. List ten areas where our society has selected an EXPEDIENT MEASURE rather than an ETHICAL POSITION. Do you believe some laws and practices (i.e., poll taxes, culture-based testing and age-level drinking laws) benefit only certain groups of people? Why or why not?

11. Develop a paper that discusses the ROLE OF TV in a youngster's search for a VALUE SYSTEM. In the future, will TV have a greater or lesser influence upon people's search for a value system?

12. In some communities, contaminants and waste materials have been dumped into lakes, rivers and streams for many years. What impact might this have on future communities that depend on water from these sources? Who will inherit these problems? What are possible solutions? What could be done to avoid similar problems in the future?

Values and Expediencies
Words to Know

The words that follow are important because they relate to Values and Expediencies. Write out your most appropriate definition for each of the words listed. These words go in your DICTIONARY OF FUTURE-RELATED TERMS. Add new words as you find them.

1. expediency: _____
2. lifeboat ethic: _____
3. mature society: _____
4. pluralistic society: _____
5. post-affluence: _____
6. railway thinking: _____
7. self-fulfilling prophecy: _____
8. spaceship ethic: _____
9. suitcase war: _____
10. value: _____
11. value system: _____

Values and Expediencies
News Articles

Human relations is a concern in countries around the world. The following was written by a woman reporter who interviewed women journalists from five foreign countries as they discussed human values. That the journalists were are all women is significant; they came from Nepal, Hungary, Russia, South Africa and Sri Lanka—countries where women's roles in society have traditionally been underplayed. In the interviews, each journalist compared working in her own country to her experiences at a 1990 conference sponsored by the International Women's Media Foundation in Washington, D.C.

Changing world changes world of journalism

Last year, when Nepal's King Birendra promulgated a new constitution and lifted a 30-year ban on political parties, life improved for journalists in Nepal, says Bharati Silawai. Silawai, chief editor at *Media Nepal* in Kathmandu, states that the new constitution guarantees the freedom of the press, which was not previously guaranteed.

Before, "at any time, a journalist could be interrogated, taken in, imprisoned, tortured, beaten, just because the regime thought you had printed something that was contrary to them. Now [I have] a lot of freedom really to go out and work."

No women hold leadership roles in radio of television broadcasting in Hungary, says Gyorgi Jakobi, editor and commentator at Radio Budapest who broadcasts the news of Hungary via short wave to the English-speaking world.

"There are fairly many women journalists in the profession, but they are not at the top. This is partly because there is still a belief that men are better than women."

In the past, [reporters] could not talk about the opinions of the government's opposition. "Now," Jakobi says, "we can say just about everything and anything we like."

(Excerpted from *USA Today*, January 7, 1991.)

The other journalists also talked about freedom of the press. Yevgenia Albats, a feature writer for the *Moscow News*, said that there had been no freedom of the press in Russia until June 1990, when a new law took the press away from government censorship.

Novavenda Mathiane, an editor at *Frontline Magazine* in Johannesburg, South Africa, said it is a new world for reporters because now they can report anything. While visiting the United States, she heard American reporters say that women's issues were important in South Africa. She stated, however, that the real issues in South Africa were racial ones, dealing with black and white human rights.

The Sri Lanka Broadcasting director, Anthea Peria Flambert, stated that journalists should not hurt the government in power with their reporting. She also said that a woman's traditional role in her country is still homemaker, wife and mother, but that many women are active in broadcasting and in government positions, and she noted that Sri Lanka had a female prime minister.

WRITE your ideas about the following questions in your journal. What do you think about living in areas where there are no political parties, elections or news except as allowed by the government? Would you like to live in countries where women do not have the same rights as men? Why or why not?

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What is happening politically in different countries of the world where members of the press have freedom to write news as they see it?

As an ongoing class project, MAKE a 3-column chart of countries that violate people's rights. List countries that have little regard for human rights in column 1. Cite the news sources for your information in column 2. In column 3 write the specific human rights that were violated according to your news items.

Name Of Country	*News Source*	*Right(s) Violated*

WRITE three questions of your own regarding human rights. Use them in class discussion.

The following article is about values enhanced through education.

READ the article and DISCUSS the following questions: Why would a community such as the one described in the article want or need to get involved in education? What might be gained for the mills? What lifestyle values would be enhanced by better education in a mill town? In your town? What programs might be developed for those already working at the mills and not affected by the agreement described in the article? PROJECT your ideas of what value changes could occur in this small town by 2015 due to this new focus on education.

WRITE three of your own questions to use in class discussion about the new emphasis on values for life that are found in education.

Factory town works on education

In a small town in Georgia, the computerized manufacturing process of the giant carpet mills rolls out over 65% of the nation's floor coverings. The tradition there through the generations has been that students could leave school for factory jobs as soon as possible. The workers, with over half of them failing to complete high school and 20% functionally illiterate, have failed to keep pace with technology and change. Community industry leaders decided to make education of the work force a part of their business.

Great interest has developed in training front-line workers. Some examples: When one mill offered a high-school equivalency course, nearly half of the employees enrolled. Three hundred and nine companies signed an agreement that they would not hire high school dropouts in factory jobs. By 9 A.M. on any weekday, the parking lot at the Adult Learning Center is jammed and there is a waiting list for basic reading and math courses. One community education leader stated that it has taken business and industry a long time to realize that education foes have an impact on production in the mills.

(Excerpted from *The Christian Science Monitor*, March 26, 1991.)

STUDENT REPORTERS: LOOK at the headings on the introductory collage for this section. These examples, taken from newspapers, will help you CHOOSE and WRITE your own news item, focusing on future-related values.

WRITE a second article for your class newspaper. Report how some decisions that were made in the past can slow down progress and scientific advancement today. (One example might be the mandatory retirement age required in the past when people seemed older at that age.)

Values and Expediencies
Study Unit

PHASE I: Reaction to the Articles

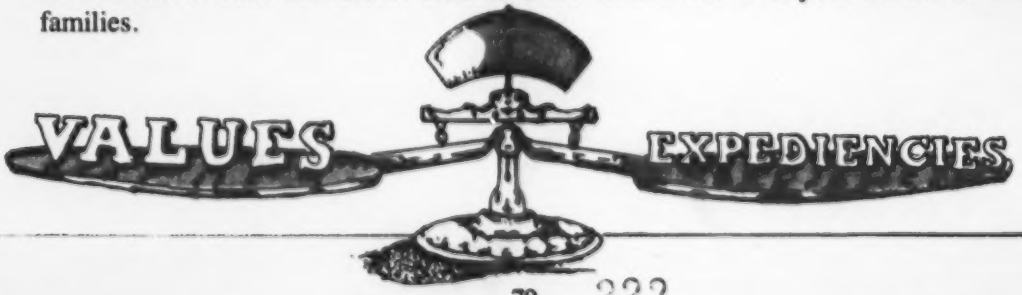
Examine the articles and clippings in your file entitled "Values and Expediencies" and the files in the CLASS LIBRARY of future-related items. Respond to the questions below in addition to those on the Reaction to the Articles form found on page 102 of the Reference Section. Your teacher will provide copies of this form or ask you to copy it. Place your reactions in your notebook.

1. Review your definitions of "value" and "expediency." How many different VALUES and EXPEDIENT MEASURES did you find in your files or in those maintained by the class? List at least three values from your files.
2. Select three articles relating to expedient measures and summarize the significant facts.
3. A paper collage is an arrangement of diverse materials, such as pictures, news items and magazine articles, mounted together. Create a collage using the headlines and titles from news items and articles. Determine which values or expediencies should dominate your collage.
4. Can you determine WHICH values are the MOST IMPORTANT among your clippings and articles?

PHASE II-A: Forecasting Based on Your Responses to the Articles and the Above Questions

Use the Forecasts form on page 103 in your Reference Section. Your teacher will provide copies of this form or ask you to copy it. Use it as a guide as you make your forecasts about the future of Values and Expediencies. Forecasting the future is usually based on past happenings and present-day research.

1. Based on your responses to the articles and information gained to this point, what are your future-related ideas regarding this country's VALUE SYSTEMS? What are your forecasts about the use of EXPEDIENT MEASURES in the United States?
2. In the area of Values/Value Systems, which articles provided the most forecast material? In what ways have they helped you?
3. Are forecasts involving future values featured in newspapers and magazines? Bring two such articles to class and discuss them as future-related values for your classmates and their families.



PHASE II-B: Alternative Futures for Life in the 21st Century as a Result of Advances in Values and Expediencies.

Use the Alternative Futures form on page 104 in your Reference Section as a guide as you construct a future which must absorb the impact of your forecasts. Your teacher will provide copies of the form or ask you to copy it.

1. How does a strong VALUE SYSTEM affect the lives of a society's citizens?
2. What would occur in a society if any and all EXPEDIENT MEASURES were tolerated?
3. What VALUES would you recommend for your twenty-first century?

PHASE III-A: Your Area of Individual and Group Research

Use the Research/Report Outline form on page 105 in your Reference Section. Your teacher will provide copies of the form or ask you to copy it. This form will be used as the top page of your report. Your teacher can use it as a guideline for evaluating your report. You may wish to review the material on Focus Questions on page 7.

LIST your interests in future value systems, future ethics, and future morals on a separate paper. Refer to the Introductory Questions at the beginning of this unit. These questions can be a starting point for your area of research. REWORK the Introductory Questions and your interests into one or two Focus Questions for your investigation. The following is an example of a focus question: WHAT WILL BE NEEDED FOR A FUTURE VALUE SYSTEM THAT WILL BENEFIT ALL PEOPLE?

On the Outline form, fill in the TOPIC and one or two FOCUS QUESTIONS. Under PLANNED RESOURCES, indicate which of these materials you expect to use in your report. The ORGANIZATION section is a modified outline for your report:

1. **Introductory Statement:** Why did you select the topic? How do you plan to go about answering the focus question(s)?
2. **Resource Summary:** How will you use the resources you have selected? Where will you find the resources? If you plan an oral report, will you use any audio or visual aids?
3. **Concluding Statement:** What has been the result of your research? What conclusions will you present to the class or to the teacher? Did you expect these conclusions when you formulated your research design?

TITLE OF REPORT: _____

DATE OF REPORT: _____

Note: These are written reports, but, in addition, some of you will be selected to present oral reports as well. The six students who participate in the presidential campaign may be excused from this activity.

PHASE III-B: Presidential Campaign Speech

Six students will prepare presidential campaign speeches and present them to the electorate—the class. One of these six will eventually be elected and will become the "President of the United States."

Each of the presidential hopefuls should select a name for his or her political party. Speakers should concentrate on two main topics: what they intend to do for the country in the next four years (or has this changed?) and how they plan to strengthen the country in the future, especially in the areas of ETHICS, VALUES, and MORALS. Speeches should be four to six minutes long.

The Presidential Campaign Schedule

	Speaker	*Party*	*Date*
1.			
2.			
3.			
4.			
5.			
6.			

PHASE III-C: Individual or Small-Group Action Research

Use the Suggestions for Research and Report Topics found on pages 94 and 95 of this workbook.

Alternative Futures implies that you have a choice among several futures. It further implies that you can actively work for the future you prefer. The Action Research Section involves you in Preferable Futures.

Work as individuals or in groups and present your reports to the class. Here is your chance to tell others about the IDEAL FUTURE you have created! Your teacher will develop a schedule for the presentations. Remember, the difference between Phase III-A and Phase III-C is ACTION!

PHASE IV-A: Personal Assessment

Use the Personal Assessment Sheet on page 106 of the Research Section to assess your involvement in the future. Your teacher will provide copies or ask you to copy it.

Think about the following questions and write your responses on another sheet of paper. Place it in your notebook.

1. What could be your contribution to the development of a VALUE SYSTEM for the future?
2. What action could you take to curtail EXPEDIENT MEASURES in the future?

PHASE IV-B: Creative Problem Solving

Use the CPS Grid on page 107 of the Reference Section. Your teacher will provide copies or ask you to copy it.

Review the section describing the use of brainstorming and the evaluation grid found on pages 23 and 24. Then follow the procedures as given by your teacher to explore some creative solutions and to develop criteria for one or both of the following problems. Choose the most appropriate solutions.

1. Develop a VALUE SYSTEM for your future.
2. Use a VALUE SYSTEM to rid society of violence and vice.

Note: After the brainstorming session has been completed and the grid is filled in with solutions and figures, sections of the class might be assigned to investigate the solutions that received the highest point totals.

REVIEWING YOUR FUTURE OPTIONS

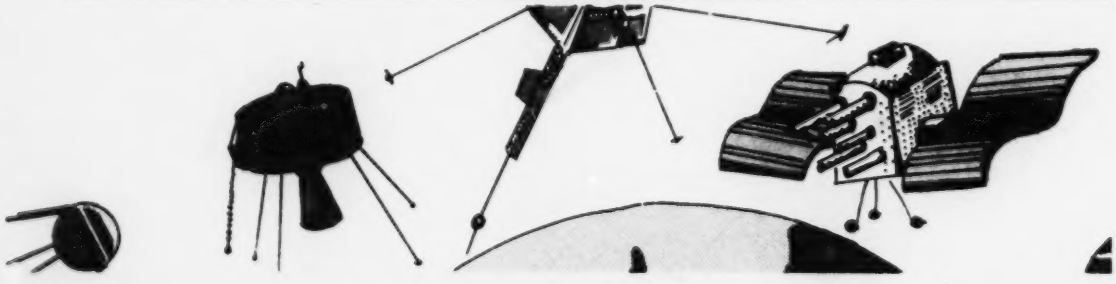
Communications, Work, Education, Health & Values

It is **your** future! **You** are the futurist! **Your ideas** about your future are important!

1. In your opinion, to what extent will the numbers of military, aeronautical, maritime, domestic, experimental, regional, and broadcast satellites continue to increase? For what reasons should they continue to increase?

2. Write the heading "Work in the Future" on a separate paper. List ten to fifteen jobs that you would recommend to family members and friends who will be looking for employment within a few years. Select five of those jobs that you consider most appropriate for yourself. In the space below write your reasons for choosing those five jobs.

3. Describe the kind of school you would like to see in the year 2030. Include home/school contact, the school's relationship with the community, technology in the schools, the "3 R's" and teaching procedures.



4. In what year will you celebrate your 109th birthday? _____ List ten or more health and medical technologies and/or practices which will help you reach that age.

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

5. Population continues to increase. To what extent will you need to share more in the 21st century? More babies are born every day while active and alert senior citizens are living longer. What concerns do you foresee for yourself regarding sharing facilities, energy sources, and food supplies with an ever-increasing population?

_____

_____

_____

_____

_____

6. You are a futurist. You will live and work in the future. Write your definition of a futurist, including what a futurist does and why. Compare your definition with the one you wrote at the start of this workbook (page 15).

_____

_____

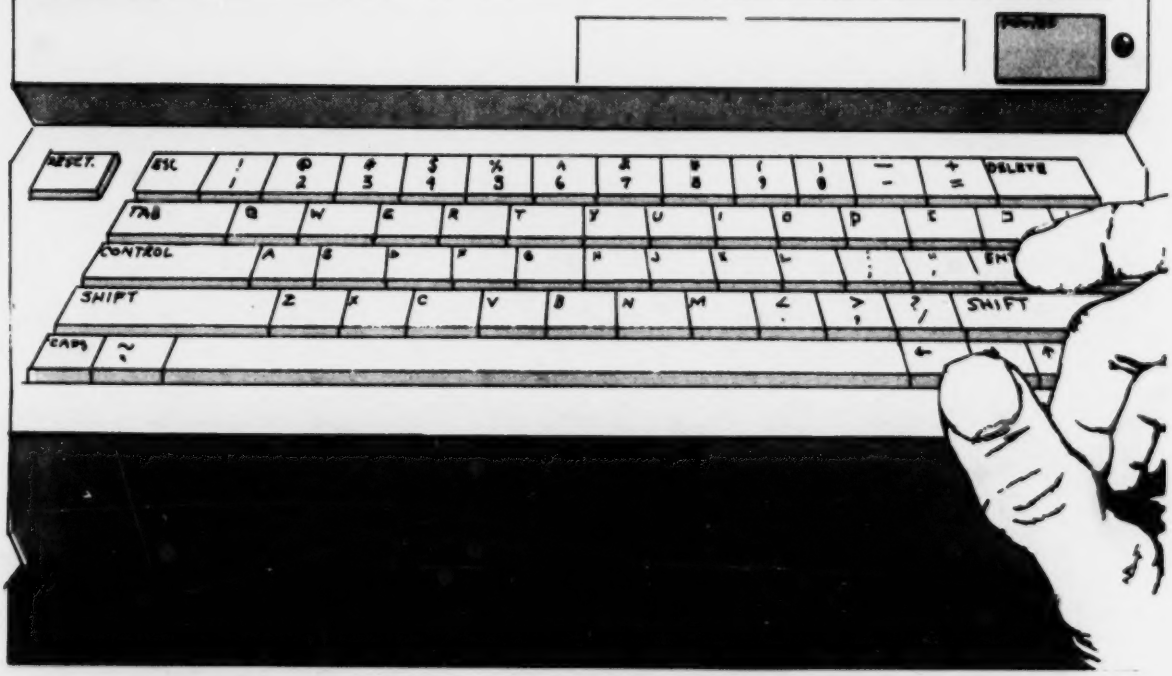
_____

_____

_____

YOUR REFERENCE SECTION

Mini-Biographies
What Some Futurists Have Said
Graphs, Trends and Tables
Delphi Technique
Research Suggestions
Major Life Activities Charts
Forms
CPS Evaluation Grid
Glossary
Thinking-Skill, or Process, Verbs



Mini-Biographies
Twenty-First Century Men and Women In the Twentieth Century:

This section introduces you to a few accomplished people who have expressed concerns and ideas related to living in the changing future. You have read about many people with similar concerns in every issue of your daily newspaper. They include people from all professions and all nationalities. Medical researchers, astronauts, scientists, politicians, teachers, writers, and communicators represent only a small part of the complete list.

LOOK UP other futurists in your library. Start by checking in the CARD CATALOG or in a PERIODICAL INDEX for names and titles of articles under the general topic heading "FUTURE." LIST those articles that sound interesting to you. When you find materials written by these futurists, clip them or make copies for your NEWS ARTICLES NOTEBOOK. If the material is too long, make a note about it and place it in your journal.

DANIEL BELL Born in New York City, 1919

Sociologist, Journalist, Educator, Writer, Lecturer, Head of the Commission on the Year 2000

Daniel Bell introduced the phrase "post-industrial society" to describe a nation that is moving out of an industrialized period of history toward an automated, technological era. Bell has stated that landowners and soldiers were dominant figures in the pre-industrial period and that businesspeople became dominant during the Industrial Age. Now, in the post-industrial era, he considers scientists and researchers as the most dominant figures.

In 1960 Bell wrote *The End of Ideology,* which introduced him to society as an original social thinker. In 1964, he wrote an essay, "Twelve Modes of Prediction," in which he first outlined several modes of forecasting including trends, extrapolations, and scenarios.

In 1965 Daniel Bell was appointed to chair the Commission on the Year 2000. He accepted this responsibility because he thought we ought to use a systematic approach to anticipate social problems, to design new institutions, and to propose alternative programs so that people could and would have choices.

In 1973 he wrote *The Coming of the Post-Industrial Society.* In it he described his thoughts about social indicators, long-range social forecasting, the year 2000, theories of social change, and concerns about disjunction between culture and social change.

The following are some books written by Bell:

The End of Ideology

The Reforming of General Education

The Coming of the Post-Industrial Society

The Cultural Contradictions of Capitalism

Other important works include:

"Twelve Modes of Prediction" (an essay)

"Toward the Year 2000" (a report of the Commission on the Year 2000)

Other information about Daniel Bell can be found in encyclopedias and in library sources. Check with your librarian.

MARILYN FERGUSON

Born in Colorado, 1938

Publisher, Editor, Writer, Lecturer, Humorist

Marilyn Ferguson is best known as the author of the book *The Aquarian Conspiracy*. She is the publisher of Interface Press and the editor of the *Brain/Mind* bulletin and the *Leading Edge* bulletin. Ms. Ferguson believes that social transformation is taking place in all places all the time. She questions whether people understand how the values of the past are affected by the social transformation and how new values are being established.

Ms. Ferguson feels that humanity is on the brink of realizing its true potential. She further believes that each individual person is part of the key to worthwhile change in the future.

The following excerpted statement supports her concern that each person can choose responsibility for the shaping of the future: "Our past is not our potential. In any hour . . . we can liberate the future. One by one, we can rechoose. . . . Whatever you may think about yourself, . . . you are not just you. You are a seed, a silent promise."

Ms. Ferguson has also written *The Brain Revolution* in which she asks if there might not be more than five senses, perhaps as many as twenty. She considers the human brain as the newest and perhaps the last frontier in our exploration of ourselves.

Other information about Marilyn Ferguson can be found in library resources and on the jackets of her books.

MARSHALL McLUHAN

Born in Canada, 1919—Died 1980

Communications Theorist, Teacher, Author, Poet,
Fellow in the Royal Society Canadian Roman Catholics

Marshall McLuhan generated many controversies with his theories about the effects of the media on society. He believed that the characteristics of an information medium, such as television, rather than the content, determine what a viewer will experience.

He was considered controversial, but he challenged humanity to think in new ways about communication and living for tomorrow. He strongly criticized the view that machines will someday regiment and homogenize people. He also challenged the division of educational curricula into separate subjects.

McLuhan taught in Canada and later served as Director of the Center for Culture and Technology in Toronto.

The following are some books written by McLuhan:

The Mechanical Bride

Understanding Media: The Extensions of Man

The Gutenberg Galaxy

The Medium Is the Message: An Inventory of Effects

Other information about Marshall McLuhan be found in some encyclopedias and in library sources. Look in the card catalog under his name and under the titles of the books listed above.

GLENN T. SEABORG Born in Michigan, 1912

Chemist, Scientist, Discoverer of Plutonium, Winner of the Nobel Peace Prize, Author

Glenn T. Seaborg was one of a group of scientists who discovered the element plutonium, essential in atomic energy. They were impressed by the power they had unleashed and concerned that it might not be used for peaceful purposes.

In 1952, Seaborg won the Nobel Peace Prize for his work with Edwin McMillan in the discovery of new elements after uranium had been found. Despite the destructive capabilities of the new elements, Seaborg believed that the new discoveries would be used for peaceful purposes that could benefit humanity. He predicted the 1973 world energy crisis and believed that nuclear energy had been developed at just the right time. He asserted that we must learn to live with the atom wisely and that we must recognize, anticipate, and deal with all environmental aspects and prospects of nuclear energy.

Seaborg has expressed his views to Congress and other government officials as well as in his writings. He has traveled over all of the world to state his message that peaceful uses of nuclear energy can give humanity the ability to create and maintain a peaceful and prosperous world.

Seaborg's philosophy includes the concept that human beings can improve their lot through the proper use of science and new technologies. He looks at the future as a global civilization in which human beings coexist with each other and with nature.

The following are some books written by Glenn T. Seaborg:

Man and Atom

The Future, Ideas in Conflict

Other materials by and information about Glenn T. Seaborg can be found in your nearest library.

ROBERT THEOBALD Born in India, 1929

Economist, Futurist, Publisher

Author of *The Rich and the Poor, The Abundant Society* and *The Rapids of Change*, as well as a dozen other books, Theobald studied at Cambridge and Harvard. Trained as an economist, he is now generally referred to as a futurist, although he dislikes all labels. He suggests we revitalize our economic and social values and learn how to distribute our country's riches justly and morally among all. Theobald "does not think that the economic, social and political attitudes developed in earlier years will necessarily be suitable in today's conditions."

He has been a speaker in 49 states, where he has expressed his concerns regarding future changes to public, private and voluntary organizations. He has also been a consultant for such organizations as the Economist Intelligence Unit, General Electric, the American Management Association and the United Nations.

Theobald has been exploring the spiritual issues that are raised in *The Rapids of Change*. He is also the general editor of a series of books dealing with future studies and change.

The following are some books written by Theobald:

The Rich and the Poor

The Abundant Society

The Rapids of Change

Other information about Robert Theobald can be found in encyclopedias and in library sources. Check with your librarian.

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What Some Futurists Have Said!
And Project Ideas Based on Their Comments

LIFE EXTENTION

Dr. Joel Kurtzman, author of the book *No More Dying*

"A drug company may one day come out with an anti-aging pill, without any advance notice."

NOTE: Dr. Kurtzman wrote his book to describe advances in medicines, drugs, chemicals, oils, and ointments that help with extension of life. He does not explain what might happen when people stop dying and babies continue to be born.

PROJECT IDEA:

Form small groups and discuss why you would or wouldn't like to invent an anti-aging pill. Use the brainstorming techniques you previously learned (see page 23 for a review of brainstorming) to list the advantages and problems related to a universal availability of longer-life pills.

Still in the group, research and list as many products as you can that are advertised on radio and television and in newspapers and magazines that should help people feel better and live longer. Are those ads believable? Might they be believable by 2005?

EDUCATION FOR TOMORROW

Anonymous poem

I saw TOMORROW marching by on little children's feet;
Within their forms and faces, I looked at prophecy complete.
I watched TOMORROW look at me from little children's eyes,
And thought how carefully I would teach if I were wise.

NOTE: The word "anonymous" is used when the author of a statement is unknown. The importance of this little poem is not in the authorship, but in the thought or concept presented. This poem expresses a concern for children in their futures.

PROJECT IDEA:

In a small group discussion, share your ideas and feelings about the intent of the poem. Write down the ideas that seem most logical to you regarding the poet's statement about children's needs and perhaps about teachers' needs.

Express your ideas about the importance of teaching in relation to planning and preparing for the future.

It might be fun to try your hand at writing your own short peom about some aspect of living in the future. If enough poems are well-received, the class might want to put together a collection of poems about living, working, and going to school in the future.

LOOKING AT THE FUTURE

Richard D. Lamm, Governor of Colorado

"We must be both dreamers and realists, a combination of Don Quixote and Sancho Panza . . . because we are at the beginning of a wrenching transition into a world as new as the world that Columbus discovered."

NOTE: Don Quixote (Kee-HO-tay), the lead character in a 1615 Spanish novel, is described as a country gentleman who imagines himself a knight and sets out to reform the world. His squire, Sancho Panza, while uneducated, is more practical about such matters as food and sleep. Quixote was the dreamer and Sancho the realist.

PROJECT IDEA:

Explain the governor's reference to a "wrenching transition"? What are your thoughts about a future world as new as the one Columbus discovered? What roles will dreamers and realists play as we move into the changing future?

ETHICAL ISSUES: ARE THEY VALUES?

Dr. Jonas Salk, research scientist, discoverer of Salk vaccine, futurist

"We must try to understand the future. It is coming at us faster than ever before. Ethical issues are at least as important as scientific ones."

NOTE: Dr. Salk is famous for developing the first polio vaccine. Since 1963 he has been director of the Salk Institute for Biological Studies at San Diego, California. He also has a reputation as a futurist with many practical concerns for life and work in the future.

PROJECT IDEA:

Look up information about Dr. Jonas Salk in your encyclopedia or library. What do you think are the differences between ethical issues and scientific ones? Develop a term paper and a presentation regarding Dr. Salk the futurist, as opposed to Dr. Salk the research scientist.

THE SKILL-RELATED NATURE OF EMPLOYMENT/UNEMPLOYMENT

Pierre du Pont, Governor of Delaware, industrialist researcher

"Few people in this country have really focused on the fact that a lot of unemployment is not recession-relacted—it's skill-related."

NOTE: Governor du Pont is considered a national expert on unemployment. He made the above statement during an interview related to the numbers of people unemployed in the United States.

PROJECT IDEA:

What are your thoughts about jobs that no longer exist due to technological innovations? With the world and the workplace changing so much in a relatively short period of time, what suggestions do you have about training people to learn new jobs and new attitudes about change?

THE FANTASTIC FUTURE

Arthur C. Clarke, futurist, scientist, science-fiction writer

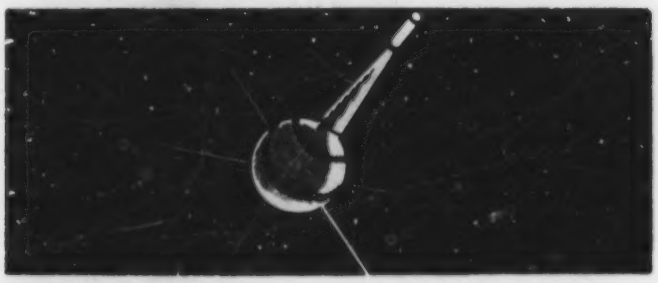
"I hope this charge will not be leveled against me. If this book seems completely reasonable, and all my extrapolations convincing, I will not have succeeded in looking very far ahead; for the one fact about the future of which we can be certain is that it will be utterly fantastic."

NOTE: Arthur C. Clarke is well-known in scientific circles for his forecasts about communication satellites, space rockets on the moon, and the use of radio and television to educate people in all parts of the world.

PROJECT IDEA:

Look up information about Clarke in your library. He wrote about technical achievements that seemed impossible and unlikely. Many of his projections have taken place already. DESCRIBE an imaginary interview with Arthur C. Clarke in which you ask for more information about his "fantastic future."

Describe a second interview in which you are the person being interviewed about your concepts of "fantastic futures."



SHARED VALUES, OR NONE

Reverend Martin Niemoller, German Protestant minister and leader, spoke against Hitler during World War II

"In Germany they came first for the Communists, and I didn't speak up because I wasn't a Communist.
Then they came for the Jews, and I didn't speak up because I wasn't a Jew.
Then they came for the trade unionists, and I didn't speak up because I wasn't a trade unionist.
Then they came for the Catholics, and I didn't speak up because I was a Protestant.
Then they came for me, and by that time there was no one left to speak up."

Martin Niemoller
German Protestant Leader

NOTE: At first, Martin Niemoller, an Evangelical minister of a church near Berlin, welcomed Hitler's rise to power. He soon realized, however, that the new politics centered on opposition to the church, racism and prejudices. Arrested in 1937 for his bold preaching about the values of people, he was offered his release on condition that he stop preaching against Nazism. He refused and was confined in concentration camps until 1945.

PROJECT IDEA:

Write in one sentence the message that Niemoller, with his observations, told the world about values of supporting and understanding others.

Delphi Research Technique (Modified)
Study Ideas and Checklist

The Delphi technique was developed in the 1950's. It acknowledges human judgment as a valid tool for making forecasts. In a Delphi study, respondents do not communicate with each other. Ideas that are expressed are not affected by "follow-the-leader" tendencies which occur in group discussions. This factor gives a broader range of options for all respondents to consider in the various rounds of a Delphi study. Use the Delphi technique when ideas are needed from many other people with future-related planning experience and/or interests.

In three or more rounds of questions and responses, ask your respondents for their solutions to your future-related concern.

ROUND ONE: Describe your concern to all respondents. Ask them for their ideas regarding your concern. Collect and consolidate their responses into a smaller number of general areas of concern.

ROUND TWO: Ask your respondents to choose from among the first round areas of concern those ideas that are the most appropriate and to indicate the three ideas they consider the best solutions to your concern. Collect and tally the new responses. Remake your list using the solutions selected most often.

ROUND THREE: From your new list of three to five solutions (obtained from Round 2) ask your respondents to select one solution, the one they consider the best for your concern. Tally those final choices. Use the one selected most as the basis for your findings and report.

STUDY IDEAS

Before beginning your research and as you proceed refer to the checklist on the next page.

Delphi Study Idea #1
Longer life spans mean that people will live longer. Where will they all live? What will they do with their free time? How might the structure of family life change in order to accomodate more seniors and elderly persons?

Delphi Study Idea #2
Many projections indicate a 37% population increase in your community by 2022 A.D. The present transportation systems (roads, cars, buses, trains, etc.) are considered inadequate for today's needs. What are your recommendations to help alleviate anticipated future travel concerns?

Delphi Study Idea #3
When the population of the world reaches eight billion and the population of the United States reaches 450 million, what kinds of materials will be used to build homes and other places to live?

Delphi Study Idea #4
With the increase of home computers that can be used in conjunction with the school curriculum, how long will the school day be in 2015 A.D.?

CHECKLIST FOR DELPHI RESEARCH

_____ 1. Determine a future-oriented problem or concern. Write it as a statement. Include a question asking respondents for their suggested solutions.

_____ 2. Mail or deliver your statement to your selected respondents. (See the note below.) Your information to the respondents should include your reasons for conducting the study and their instructions for responding. It should also inform them that you would like them to reply to a total of three sets of requests for their opinions.

_____ 3. Collect all responses and list all the opinions received.

_____ 4. Categorize all of the responses into groups of related solutions.

_____ 5. Develop a single statement for each related category of solutions. Make a list of those statements.

_____ 6. Send the list of statements to the original respondents. This time ask them to choose one to three solutions that they consider the best for your original concern. Invite them to explain their choices.

_____ 7. Collect and tally the second group of responses. Make a final list of the three to five solutions that were selected most often. You might modify your statements based on your respondents' explanations or comments.

_____ 8. Send the final list of solutions back to the same respondents. Request that they select the one that they consider to be the most adequate solution to your original concern.

_____ 9. Collect the third set of responses. Tally them in order to determine the most preferred solution.

_____ 10. Use the findings of your research and the comments and observations of your respondents as the basis for your report. Write your report.

Respondents: Who and How Many?

Some Delphi projects use hundreds of respondents; others limit the participants to twenty-five. Use people who have had some experience in future studies or other future-related activities as well as those who have had limited contact with futurist ideas. For a class project, perhaps thirty-five to sixty respondents would provide the group with valid findings and conclusions. Caution: Allow enough time between the activities on your checklist for the respondents to reply.

Suggestions for Research and Report Topics

The following is a partial list of product ideas. Add your own suggestions to this list. With your teacher's advice and concurrence, select one or more of these for your project.

1. Read the mini-biographies entitled "Twenty-First Century Men and Women in the Twentieth Century," which can be found at the beginning of the Reference Section. Conduct further research into the futurist concepts of these people.

2. Refer to "What Some Futurists Have Said" in the Reference Section. Note that a project is suggested with each statement. Select one or more for your project activity.

3. Write letters to influential people in your community describing your future-related concerns and ask for their ideas about the future.

4. Ask appropriate people in your community about value systems. Describe values and value systems. Develop a set of values for yourself and for your future.

5. Plan some questions to ask people about a better future. Interview six to ten people. Tabulate their responses and write your opinion.

6. Build dioramas, models, and/or murals that depict your concept of some aspects of living in the future.

7. Write a scenario describing an aspect of your world: schools, automobiles, telephones, etc. Show how your subject changes between the present time and fifty years from now.

8. Develop a slide presentation about changes that will be taking place in your future world for the next thirty-five years.

9. Plan and construct a poster or a flyer describing the need to educate people about conservation practices.

10. Conduct a research project about endangered species of animals.

11. Organize a student-futurist club. Plan and hold meetings and activities related to future study. Write to other futurist groups for information about their clubs.

12. Compose an ad for a newspaper. In your ad, invite volunteers to join your exploration company. Describe the jobs that are open, living conditions, basic compensation, bonuses, and other benefits to be gained from association with your company. Your company might employ space explorers, space construction crews, underwater housing builders, builders of underground transportation systems, ocean farmers, and/or space farmers.

13. Plan and edit a student-futurist newspaper.

14. Collect reports or stories about the future from other students. Edit them and compile them into a magazine of future-related articles. Include a table of contents, a title, and your own note about each of the articles.

ADD your ideas for future-related projects.

15. _____

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16. _____

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17. _____

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19. _____

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20. _____

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As you develop your projects and ideas about the future, keep in mind that it is YOUR future, YOUR tomorrow!

Your Research Plan

Your assignments range from one-person projects to group and class activities. In any size group, the development of an investigative procedure, or plan, is important. Your plan involves more effort and purpose than the task of copying selected items from source materials. You are to add to your research a new ingredient: your ideas and opinions based on valid, viable information. Follow the eight-step plan below for each project you do.

Steps in Developing a Research Project

1. ***DETERMINE YOUR FUTURE-ORIENTED TOPIC** related to your study unit title. You might use a key word or words from the title. For example, "The Future of Work" could be a title taken from the unit dealing with work, leisure, and education.*
2. ***FIND AND RECORD** information about your topic from resource materials, including people. LIST the resources with page numbers and reference guides. Write a short description about your information for your own reference and recall.*
3. ***WRITE** two or three QUESTIONS about your topic. The questions at the start of each study unit are good examples. Your teacher must approve your topic and questions.*
4. ***What RESEARCH ACTIVITIES** will you use with your project? See the Suggestions for Research and Report Projects on the previous pages for suggestions.*
5. ***Use** your questions as a guide during your research. Keep records of your activities, references, and findings. WRITE YOUR RESULTS and comments in your journal.*
6. ***REVIEW YOUR CONCLUSIONS.** Make an outline that you can use for writing your report. You may use charts, diagrams, and/or pictures. You may describe either the results or the project first.*
7. ***Follow** your outline step by step to WRITE YOUR REPORT. Refer to your notes. Make a copy of your report for your teacher.*
8. ***PRESENT** your report, written or oral, as agreed upon with your teacher. (If it is a group report, involve all group members in the presentation.)*

Outline Format for the Final Steps

Title: _____

Presenters: _____

Major points for emphasis: _____

_____

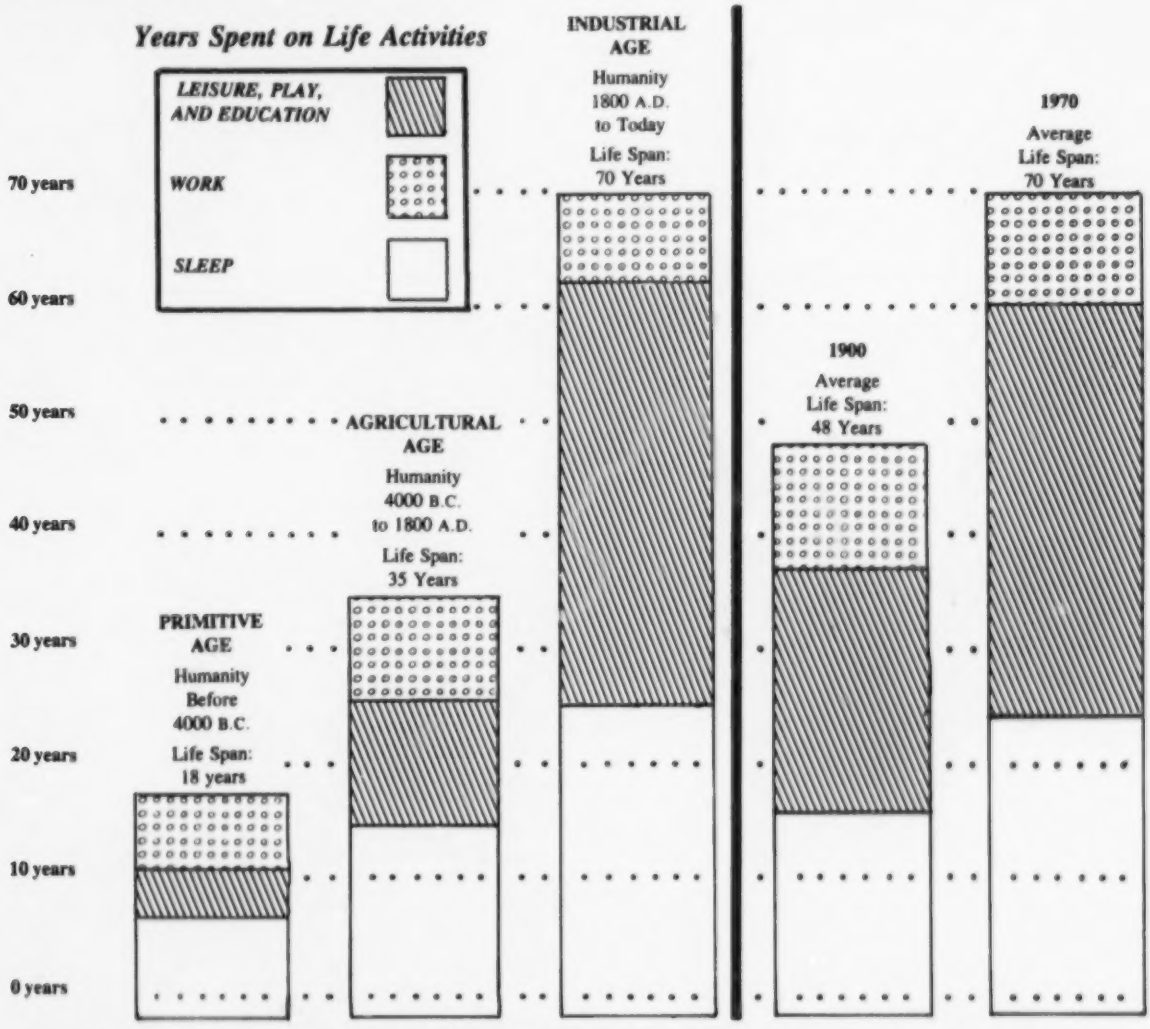
Your personal conclusions regarding the research and the report: _____

_____

Graphs, Charts and Tables

MAJOR LIFE ACTIVITIES:

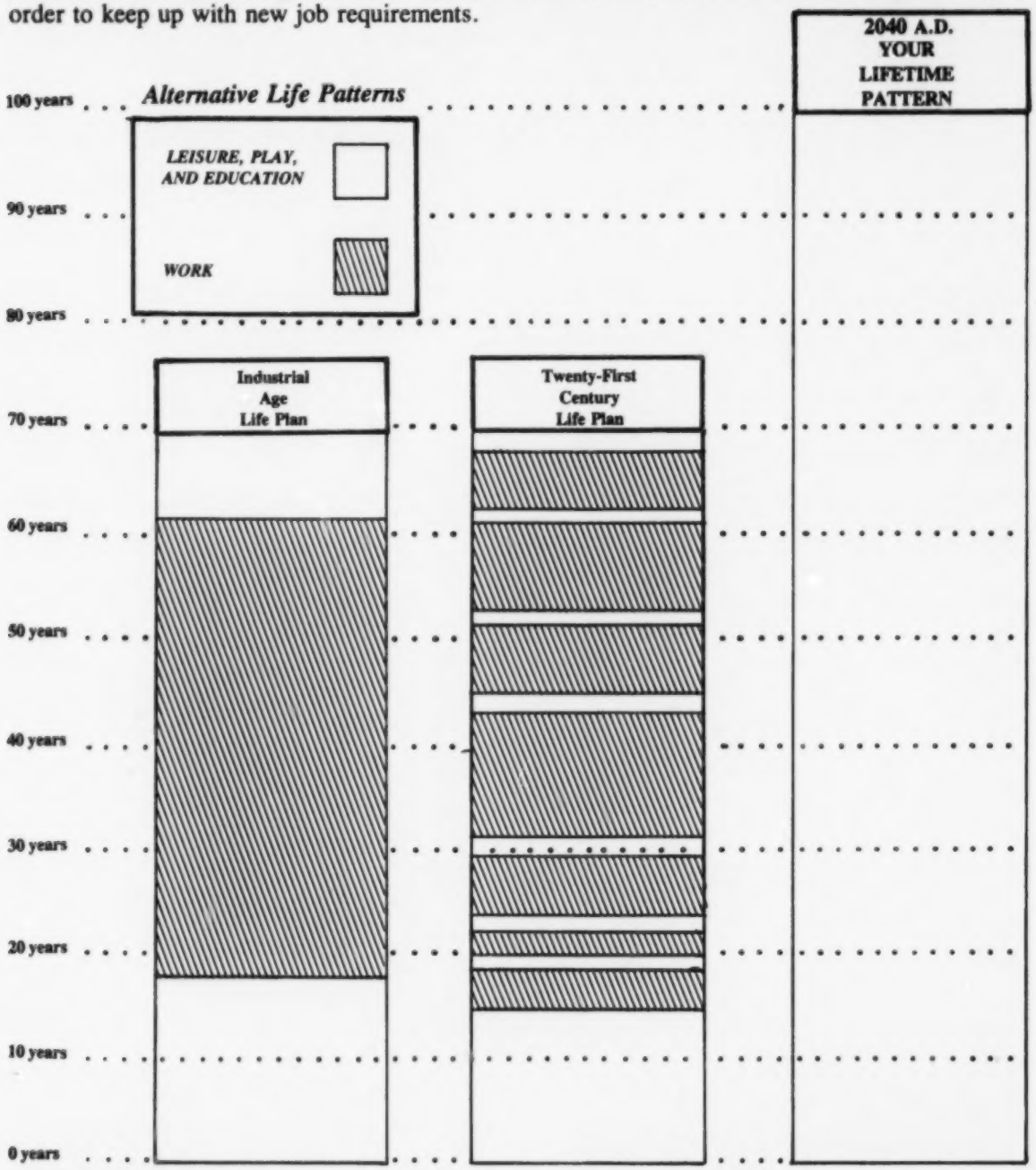
Work, sleep, leisure, play, learning, etc. are considered MAJOR LIFE ACTIVITIES. The bar graphs below show approximate years spent in those activities for different time periods. Compare the first three columns and then do the following: Compare your age today and the life span of humans of the Primitive Age. Figure out how much time humans of the Agricultural Age spent in sleep. WRITE three questions that will require comparisons among the life activities of humans in the three periods of time.



Adapted from Best, Fred, "Recycling People: Worksharing Through Flexible Life Scheduling," *The Futurist*, February 1978.

The first three bar graphs show averages for long periods of time. The next two look at specific years. Compare the life spans and life activities of the years 1900 and 1970. In which year would you prefer to live? Why? Use the same indicators that are on the chart (i.e., hatchmarks for work, dots for leisure, and white for sleep) to make a new graph that shows your ideas about twenty-first century major life activities.

The three bar graphs on this page show lifetime patterns of work and learning for the Industrial Age and for the twenty-first century. In the Industrial Age, people spent about twenty years actively learning and then generally thirty to forty years in a job or profession before having a few years of leisure. The twenty-first century graph shows a projection that will have people alternating between work and retraining for three to five cycles within a working career. Because of new technologies, jobs will be phased out by new products and innovations, and people will will need re-schooling in order to keep up with new job requirements.



Adapted from Best, Fred, "Recycling People: Worksharing Through Flexible Life Scheduling," *The Futurist*, February 1978.

Make a larger copy of the empty bar graph. Fill in a proposed pattern of work (dark) and learning (light) to show your ideas about how you might develop your own employment/education pattern in your future.

FUTURES RESEARCH:
An Analysis of a 200-Year Period

Projections & Perspectives	*Time Periods*
Future forecasting	100 years hence
Long-range forecasting	50 years hence
Intermediate-range possibilities	25 years hence
Near term	Today plus 10 years
Near past	Today minus 10 years
Historical perspectives	View of the past 100 years

Adapted from Glines, Don. *Educational Futures I: Imagining and Inventing*, page ii. Millville, Minnesota: Anvil Press, 1979.

POPULATION GROWTH, World and United States, 1750-2050

Year		*The World*	*The United States*
1750		721 million	
1776	American Revolution	750 million	3,843,000
1800		901 million	5,308,000
1830		1 billion	12,867,000
1850		1.13 billion	23,192,000
1861	American Civil War		
1900		1.59 billion	76,212,000
1930		2 billion	123,200,000
1941-45	World War II		
1950		2.509 billion	152,300,000
1990		5.3 billion	c. 230 million
2000	Low estimate	6.2 billion	c. 260 million
	High estimate	6.75 billion	c. 295 million
2050	Low estimate	11.2 billion	c. 290 million
	High estimate	13 billion	c. 310 million

The major source for these figures is from the U.S. Bureau of the Census. Other figures come from the Population Reference Bureau, the Statistical Abstract of the U.S. Students have access to encyclopedias and almanacs for reliable statistics. See the list of resources in the Recommended Further Reading Section of this book.

COMPARISON OF HEALTH COSTS IN ENGLAND, CANADA AND THE UNITED STATES

	Annual Health Costs Per Capita	Health Costs as a Percent of GNP	Infant Mortality Deaths Per 1,000 Births	% of People Not Insured for Health	Life Expectancy
England	$ 711	6.2%	9	0%	75
Canada	$1,370	8.5%	7	0%	77
United States	$1,926	11.1%	11	14%	75

Materials for this table were adapted from Time Magazine, May 7, 1990.

CHANGING VALUES

Traditional Values	Emerging Values
Higher standard of living	Better quality of life
Traditional family life	Alternative families
Hero worship	Love of ideas
Traditional sex roles	Blurring of sex roles
Expansionism	Pluralism
Patriotism	Globalism
Unparalleled growth	Growing sense of limits
Industrial growth	Information/service growth

This chart was adapted from a table by Joseph T. Plumber, *Futurist Magazine*, January/February 1989. According to the author, developed Western societies are gradually moving away from traditional values and toward new values which are being accepted on an ever-widening scale.

GETTING READY FOR THE FUTURE

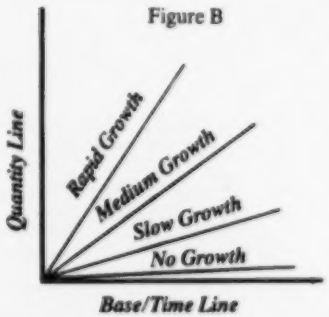
Graphs for Trends, Extrapolations, Forecasts and Projections

A. Figure A shows a sample graph with a Quantity Line and a Base/Time Line. COPY it and USE it with Phase II-B of your study units and with your projects.

B. The graph in Figure B has four added lines representing potential rates of growth: No Growth, Slow Growth, Medium Growth and Rapid Growth. The automobile industry can be used to show examples of each.

In the NO GROWTH line, the quantity of an item does not increase. For example, during World War II, automobile factories manufactured war-related materials and machinery instead of cars. Therefore, the total number of cars-in-use remained the same for each year and a no-growth line would be used.

Figure B



However, as more youth reached driving age, the total number of drivers increased. This increase would be shown on a graph as SLOW GROWTH or MEDIUM GROWTH.

RAPID GROWTH can also be illustrated by the auto industry. When World War II ended, car manufacturers retooled to match the demand for new cars by returning servicemen and servicewomen, teenagers, and other new drivers. The number of cars-in-use for that early post-war period would be represented by a RAPID GROWTH line.

Most trend lines are not straight; most show peaks and valleys above and below an imaginary center (average) line.

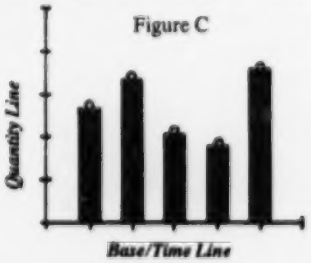
Extrapolation from your graph can help you look ahead. Your line of dots illustrates the patterns of the past. Extension of that line past any current data is a projection into your future. This kind of forecast assumes that the future for your product will be remarkedly similar to the past.

CAUTION: As in all research methods, be sure to consider other factors such as technology, economics, politics, droughts, wars and social change. These and other factors can modify your projections. Shortages of foodstuffs, raw materials and crude oil have affected people in all parts of the globe. THINK ABOUT the ways previous shortages in other parts of the world have affected you and your family.

C. Figure C shows an example of a bar graph. Bar graphs are useful as visual aids for group presentations.

For a bar graph, the QUANTITY Line and the BASE/TIME Line are drawn as for the line graph. But instead of connecting dots on a line, bars are drawn from the base line above each date up to the dot above the date. You might want to use different colors—for example, past dates in one color and future dates in another.

Figure C



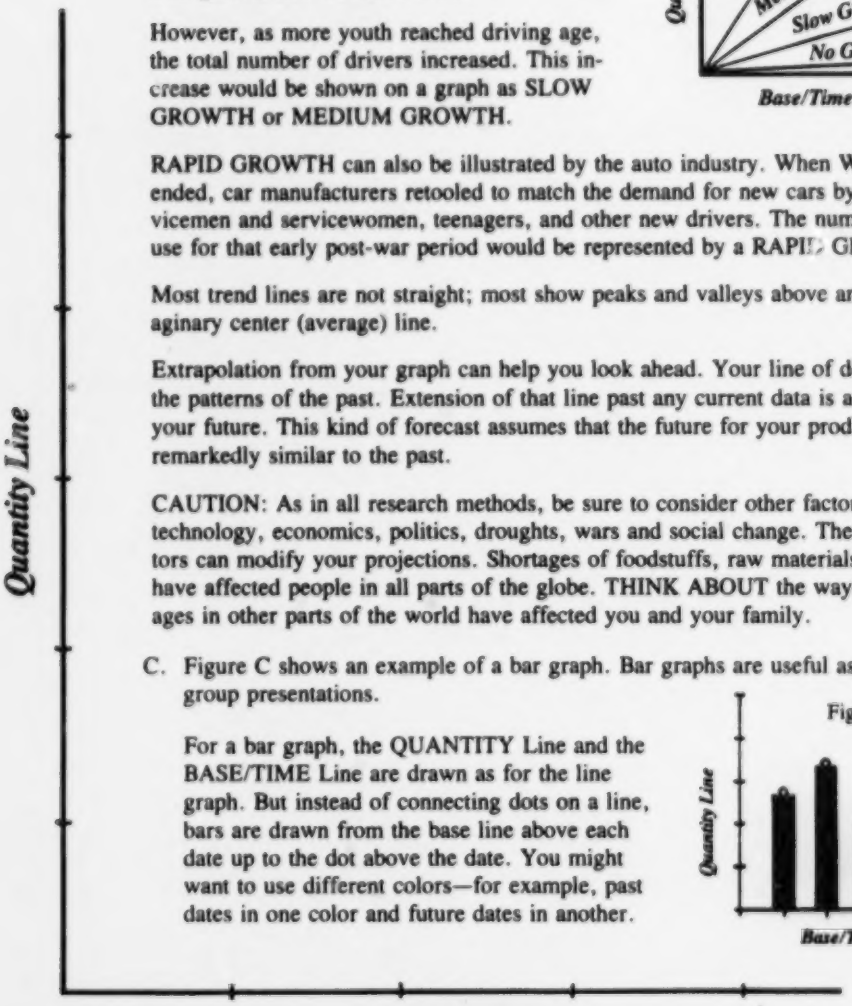


Figure A

GETTING READY FOR THE FUTURE

Phase I: Reaction to the Articles

Name of Unit: _____

What are your reactions (your feelings) after reading the articles relating to this unit?

Do the articles discuss changes that you can accept? That you cannot accept?

Have you seen similar trends in other newspaper or magazine articles?

Write the first ideas that come to mind. The class can use these ideas as a starting point for discussions.

_____

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GETTING READY FOR THE FUTURE

Phase II-A: Forecasts

Name of Unit: _____

What forecasts would you make about the future based on the articles you read and your reactions to those articles?

For example, if you read that oil reserves would be virtually exhausted in fifty years, what would you forecast about the future of personal automobiles?

Use the articles in this book, your reactions to these articles, and other articles as resources. Make two forecasts: one for twenty-five years from now and one for fifty years from now.

GETTING READY FOR THE FUTURE

Phase II-B: Alternative Futures Twenty-Five and Fifty Years Hence

Name of Unit: _____

Use the forecasts that you developed in Phase I and construct a future that must absorb the impact of your forecast. Describe the results.

For example, fossil fuel (oil) reserves are dwindling, and you have forecast the demise of the personal automobile. What will happen (twenty-five and fifty years hence) to recreation patterns? To work patterns? To other aspects of this future's social and technological fabric?

After you describe the impact of your forecast, make a value judgment. Will this future be a better world than today's? Or will it be worse?

GETTING READY FOR THE FUTURE

Research/Report Outline

I. **TOPIC:** _____

II. **FOCUS QUESTION(S)**

a. _____

b. _____

III. **PLANNED RESOURCES**

a. **Books:** _____

b. **Magazines:** _____

c. **Newspapers:** _____

d. **People:** _____

e. **Agencies:** _____

f. **Films:** _____

g. **Other:** _____

IV. **ORGANIZATION**

a. **Introductory statement:** _____

_____

b. **Summary of report:** _____

_____

_____

c. **Concluding statement:** _____

_____

V. **NEW WORDS I HAVE LEARNED**

a. _____

b. _____

c. _____

Note: This will be the top page of your report.

GETTING READY FOR THE FUTURE

Phase IV: Personal Assessment

Place your answers to Phase IV: Personal Assessment on this sheet. Remember to bring ideas from your notebooks, from discussions with your family and classmates, and from your own activities to this page. Your personal involvement is important.

EVALUATION GRID

The Problem: _____

_____

_____

_____

Directions:

1. List your ten most appropriate solutions that fit the problem statement.
2. Brainstorm all the possible criteria that will help you evaluate your problem solutions.
3. Select one appropriate criterion from each of the "general criteria classifications" to put under A, B, C, D, and E.
4. Rate all alternative solutions against one criterion at a time. (The alternative that fits a criterion best rates a 10; the one that fits it least rates a 1.)

Total each alternative solution's points horizontally and place below.

ALTERNATIVE SOLUTIONS	*Criterion A*	*Criterion B*	*Criterion C*	*Criterion D*	*Criterion E*	TOTALS
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Adapted from the work of Dr. Sidney J. Parnes and Dr. E. Paul Torrance.

Glossary

AIDS (Acquired Immune Deficiency Syndrome)—A deficiency of the immune system due to infection with HIV (human immunodeficiency virus). In its present form, AIDS appears to be new to the human population. As yet, there is no curative treatment or vaccine.

ACUPRESSURE—A technology that involves pressure on the body to relieve pain.

ACUPUNCTURE—An ancient practice, associated with the Chinese, in which parts of the body are pierced by needles to relieve pain or to treat disease.

ALZHEIMER'S DISEASE—A progressive condition in which nerve cells degenerate in the brain, and the brain substance shrinks. This disease is responsible for 75% of dementia cases in people over 65.

ANDROID—A robot that looks human; an automaton of human or animal form.

BINARY SYSTEM—A number system which uses 2 as a base. To express a number, only two symbols are required, 0 and 1. The decimal, on the other hand, uses the base 10 and the symbols 0-9.

CHIP—A silicon plate with many resistors making a logic circuit or a memory circuit.

COMPUTER LITERACY—The degree to which a person can understand and use computers and computer-related terminology.

COMPUTERIZED VOCATIONAL TRAINING—The use of the computer to plan educational programs and maintain records.

COMPUTERIZED VOICE MACHINE—Also called a "word lexicon machine." Types a letter from voice dictation with 92% to 97% accuracy.

COTTAGE INDUSTRY—Literally, an industry at home. An estimated 23 million people work at home creating products for sale. It is illegal, however, to make jewelry, gloves, mittens, belts, buckles, embroidery, and women's clothing at home for sale. These were the "Seven Prohibitions" added to the Fair Labor Standards Act in 1943 by the Labor Department. (See "electronic cottage.")

CYBERNETICS—The study of communications and control mechanisms in living things and in machines.

CYBERPHOBIA—A fear of computers or a reluctance to use computers.

CYBORG—A person into which electrical or mechanical devices have been implanted to maintain or enlarge the functions of the body.

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DWARF COMPUTER—Computers that operate inside microwave ovens, electronic typewriters, digital watches, and video games, using one or two brain chips and a small number of memory chips.

DELPHI TECHNIQUE—A method of futures research involving opinions of many futurists regarding solutions to a specific future-related concern. The research is conducted in a series of three questionnaires.

ECOTOURISM—A new travel term that carries the implication that travelers will be more interested in the environment than in the past. In addition to touring various areas of the world, the ecotourist is interested in preserving and repairing the earth and in helping the local people improve their concepts and lifestyles regarding ecology and the environment.

ELECTRONIC COTTAGE—A computer/electronic age version of the cottage-industry concept. Alvin Toffler in *The Third Wave* describes a low-cost work station in any house with a "smart" typewriter, a facsimile machine or a computer console and teleconferencing equipment. Using these machines, he contends, would radically extend the possibilities for home work.

EXPEDIENCY—The doing or consideration of what is of selfish use or advantage rather than what is right or just; self-interest.

EXPEDIENT—Useful for effecting a predetermined desired result; suited to the circumstances of the occasion rather than a longer range benefit for all; advantageous; convenient; offering what is of immediate advantage rather than what is right or just.

EXTRAPOLATE—To project, extend or expand known data or experience into unknown areas so as to arrive at conjectural knowledge of the unknown areas.

FIBER OPTICS—Glass wires, each the thickness of a horsehair, that carry tiny pulses, or flashes, of laser light at a rate of hundreds of millions of pulses a second.

FLEXTIME—A system that allows employees some flexibility in choosing the times, but not the number, of working hours in their schedules.

FORECAST—To anticipate, calculate or predict some future event or condition as a result of rational study and analysis or available pertinent data.

FUTURIST—A person with an intense interest in the future. Futurists are of all ages, nationalities, religions and occupations. The young have greater stakes in the future, but many seniors are futurists. A futurist is interested in technological advances, sociological improvements, preservation of natural environment and maintaining the values of their heritages.

GERIATRIC SOCIAL WORKER—An emerging profession related to the well-being of older people.

HEURISTIC—Relates to methods developed to stimulate further thought. A scenario depicting the death of the oceans, for example, can be used heuristically, motivating people to analyze the pros and cons of dumping nuclear wastes in the oceans.

HOLISTIC—A term used to describe the wholeness of something, from the Greek *holos*, for "complete." "Holistic health" and "a holistic view of the future" are common phrases.

HOLOGRAPHY—A method of reproducing 3-D pictures using a laser beam instead of a camera.

INDUSTRIAL AGE—An historical period of time which lasted between 300 and 400 years and ended in the late 20th century. Agricultural society grew into an industrial society, characterized by the change from hand tools and personal skill development to machine and power tools and production lines.

INFORMATION AGE—Also called the Age of Technology, the Post-Industrial Age, or the Computer Age. An outgrowth of the success of the Industrial Age. Information is considered the key product of the Information Age, including the development, storage, and retrieval of information.

INTERACTIVE VIDEO—System in which the viewer can talk back to the TV system, reacting to policy matters by signaling "yes" or "no" from the living room.

LASER—Microwave amplifier which produces an intense, narrow beam of light that is monochromatic (single color) and coherent (all its waves are in step). The term is an acronym for Light Amplification by Stimulated Emission of Radiation.

LASER HEART SURGERY—An alternative to bypass surgery when heart trouble is caused by blockages in the coronary artery near the heart. Optical fibers are sent through a major leg artery toward the heart. When the tip of the probe is stopped, laser energy vaporizes the blockage to allow blood to flow freely through the blood vessel again.

LIFEBOAT ETHIC—A moral code used by an individual or a nation to justify not aiding less fortunate individuals or nations.

LIFE-LONG LEARNING—An educational system, or emphasis, partly informal, which recognizes the need to prepare people for changes throughout their lives.

MAQUILADORA—Manufacturing plants along the United States/Mexico border that assemble finished products for export to the United States. This program makes use of less expensive Mexican labor resources to keep manufacturing costs lower than they would be if made in the United States. The are advantages and disadvantages. One advantage is that Mexican laborers who would not otherwise be employed have dependable jobs.

MATURE SOCIETY—A term, developed by Dennis Gabor, for a society that bases its choices on rational, scientific wisdom rather than on prejudice and emotion. Such a society, according to Gabor, will be able to provide a moderate level of affluence within the framework of a low-growth economy.

ORGAN-TRANSPLANT NETWORK—A communication system that matches available donor human organs with candidates needing those organs.

PERMANENT PART-TIME JOBS—The employment of people on a permanent basis to work part-time (less than forty hours a week) on specific needs or at specific times.

PLURALISTIC SOCIETY—A society in which many different groups (racial, economic, social, religious) coexist while maintaining identity and some degree of autonomy. Many futurists state that the United States is increasingly pluralistic.

POST-AFFLUENCE—A period of lowered living standards which many believe is now at hand. New scarcities and the need to learn thrifty habits will characterize this period. This contrasts with the period of affluence which lasted from 1945 to 1970.

POST-INDUSTRIAL SOCIETY—The soldier and the landowner were dominant figures in pre-industrial civilization and the businessperson in industrial society. But post-industrial society is dominated by scientists and researchers. As people moved from an industrial to a post-industrial society, power shifted from the business firm to the university and to the research institute.

PREVENTIVE MEDICINE—Personal health care and conditioning on a continuing basis in order to prevent or postpone potential illnesses and disabilities.

PRIORITIZE—To list or rate in order of priority. A society could prioritize its goals for the future.

PROJECTION—The carrying forward of a trend into the future; an estimate of future possibilities based on a current trend.

RAILWAY THINKING—Thoughts about the future in which history is seen as repeating itself. Lesser-developed nations, it is assumed, will go through the same stages undergone by advanced nations.

ROBOT—Any machine that has a computer brain and moves through or changes the world around it. Although popular conceptions picture the robot with human shapes, industrial robots are far removed from this image. They may have "eyes" and "arms" of a sort, but they are neither human machines nor androids.

ROBOTICS—The technology dealing with the design, construction, and operation of robots in automation.

SCENARIO—An imaginative representation of a possible or probable course of events. Scenarios can look ahead from present time or look back from some future event.

SELENOLOGIST—Astronomer who specializes in the study of the moon.

SELF-FULFILLING PROPHECY—A statement that tends to make itself come true because it has been uttered. If, for example, it were said that San Diego is the finest tourist city in the U.S.A. and that statement encouraged droves of tourists to visit San Diego, the prophecy would come true.

SILICON—One of the most abundant elements on earth, it is used in most transistors that conduct the flow of electricity from one pathway to another.

SMART MACHINES—Machines used in the office, factory, home, etc. which become more functional and versatile after sensors, microcomputers, and/or actuators have been incorporated.

SPACESHIP ETHIC—A moral code based on the concept that the earth is a large spaceship on which survival depends on the cooperation and coordination of all the passengers.

SUITCASE WAR—A situation, which many say we are approaching in rapid fashion, where devastating nuclear, chemical, or biological weapons could be carried to a city or military center by a single person and unleashed.

SYNTHETIC BLOOD—A flourocarbon compound that carries oxygen in the blood stream. It has been used experimentally in place of real blood in transfusions and operations.

TECHNOPOLIS—A society strongly influenced by and heavily dependent upon technology.

TELECOMMUNICATIONS—A general term expressing data transmission between a computing system and remotely located devices via a unit that performs the necessary format conversions and controls the rate of transmission. This communication at a distance can be by cable, radio, telegraph, telephone, or television.

TELECONFERENCE—People in different cities can gather in specially equipped rooms and send one another television pictures of themselves via phone networks, using the latest in digital and satellite technology.

THIRD WORLD—The poorer, developing nations of the world as opposed to the affluent, highly industrialized countries.

TOXIC WASTES—Poisonous wastes poured into the seas or dumped on the land. These wastes have contaminated wells in several areas in the United States. More than 4 million people in California alone have had their drinking water contaminated.

TRANSISTOR REVOLUTION—Began in the 1950's. Transistors are electronic devices which do the work of electron valves, but they are many times smaller and have at their center tiny pieces of silicon.

VALUES—There are many meanings for this word. For future studies, the word is often considered a basis for decision making, principles, or goals or standards held by society and/or individuals. Worthy of esteem for its own sake.

VALUE SYSTEM—Societal values tied together by common futures, needs and goals. The development of consistent values (within the society) is central to organization, to futures research and to decision making.

ADD new words that you have found in your class activities. Define them in your Dictionary of Future-Related Terms.

Thinking-Skill (Process) Verbs

These verbs have been drawn from two sources: Bloom's Taxonomy and Guilford's Structure of Intellect. Since dual sources were used, the lists could be headed in different ways. Note, for example, that List I could be identified as either KNOWLEDGE (Bloom) or MEMORY (S.O.I.). List II could be headed as either COMPREHENSION (Bloom) or COGNITION (S.O.I.). Lists III, IV, and V have been provided with their alternate titles in a similar manner.

LIST I ***Knowledge/Memory***	**LIST II** ***Comprehension/Cognition***	**LIST III** ***Application/Convergent Production, Transformation***
IDENTIFY	REWORD	SOLVE
RECITE	CONVERT	ADOPT
SHOW	EXPAND	UTILIZE
REPEAT	RETELL	EMPLOY
LOCATE	RESTATE	USE
LIST	EXPLAIN	TRY
CHOOSE	OUTLINE	PROFIT BY
LABEL	ACCOUNT FOR	OPERATE
SPELL	SPELL OUT	DEVOTE
POINT TO	ANNOTATE	PUT IN ACTION
MATCH	TRANSFORM	PUT TO USE
FIND	CONSTRUE	

LIST IV ***Analysis/ Convergent Production***	**LIST V** ***Synthesis/ Divergent Production***	**LIST VI** ***Evaluation***
BREAK DOWN	CREATE	JUDGE
LOOK INTO	COMBINE	APPRAISE
EXAMINE	BUILD	WEIGH
TAKE APART	MAKE	REJECT
DIVIDE	REORGANIZE	DETERMINE
DEDUCE	CONSTRUCT	ADJUDGE
INSPECT	BLEND	ARBITRATE
TEST FOR	GENERATE	RULE ON
SEARCH	EVOLVE	CRITICIZE
CHECK	ORIGINATE	CENSURE
SIFT	CONCEIVE	CLASSIFY
STUDY	FORMULATE	GRADE

Recommended Further Reading

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Wrangham, Elizabeth. *Communications Revolution.* St. Paul, Minnesota: Greenhaven Press, Inc. 1980.

Magazines

The following magazines often contain articles pertaining to future studies:

Discover	*The Futurist*
Omni	*Popular Science*
Science Digest	*Technology Illustrated*

The following references are included as sources of data related to the past and the present with many projections into the future. The first two are often found in school libraries and in some classrooms. All three are commonly found in city or public libraries. All have excellent indexes.

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NOTES

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Educational
Impressions